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Studies on the rodents of Montana

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STUDIES

on the

RODENTS OF MONTANA

by

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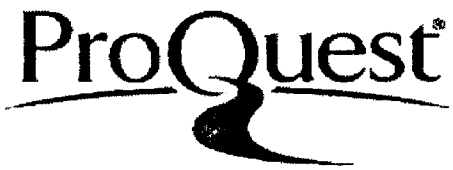

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INTRODUCTION

The control of rodents has become a major problem in Montana during the past few years. Many sporadic local attempts have been made to exterminate them but interest soon waned. The marginal and submarginal lands have been happy breeding grounds for thousands of rodents. Then when cultivation pushed into these lands living became easier and the rodents increased. Today the losses to agriculture in Montana are staggering and more and more attention is being given to the eradication of these pests. In the Livingston (Mont.) Enterprise for February 20, 1935 the following news story appeared, "CONTROL OF RODENTS IS HELD IMPORTANT AGRICULTURAL NEED."

> "An increase in predatory animals and rodents in both public and private lands by reason of the lack of funds to continue control programs, is shown in a report from R.E. Bateman, district agent of the U.S. predatory and rodent control bureau in Billings.
>
> Commenting upon Mr. Bateman's report and basing his judgment upon information gained in this region, Ranger C.V. Rubottom, in charge of the Crazy mountain district of the Absaroka national forest, yesterday said that he believes rodent control to be even more important than predatory animal control.
>
> Last spring a control program was conducted in this vicinity by the U.S. Biological Survey in cooperation with the forest service, covering 13,786 acres of area infested with ground squirrels, 3,410 acres infested with pocket gophers and 325 acres infested with woodchucks, all within the forest boundary. In addition, ranchers near the boundary were provided with government poison bait with which they covered 2,560 acres of government land and 3,260 acres of private land. As a result of this campaign, Mr. Rubottom said, the areas treated were comparatively free of rodent pests during the past year, resulting

in decided benefits to the ranges. Rodents, he pointed out, can increase in such numbers and can consume such large totals of grass as to seriously impair ranges. Because of their prolific nature, unless control measures are continued, the little animals will rapidly spread back through the areas which were cleared in last spring's campaign, he pointed out. For that reason, he expressed the hope that a general rodent control program covering both private and public lands, will be undertaken as a part of the government's relief measures.

In connection with this situation, the Wool Growers' Association, which met in Butte several weeks ago, drew up a resolution requesting congress to appropriate money sufficient for a ten-year drive against predatory animals and rodents that prey upon stock and game animals, as well as deplete ranges. Unless extensive rodent control keeps pace with the killing off of predatory animals, such as hawks, coyotes, and snakes, Mr. Rubottom points out, the balance of nature is upset, and the rodents begin to increase remarkably."

In this study of rodents I started to write only on the rodents of the Shields Valley, but acting on the advice of Dr. M.J. Elrod I included all the rodents of Montana. It has been impossible for me to see or examine all the rodents to be found in this great State, but of those found in the Shields Valley I have missed only a few and those omissions are noted in the test.

This study has followed the arrangement used by H.E. Anthony in his "Field-Book of North American Mammals."

In the first section I have discussed the food habits and economic aspects of the rodents of the Shields Valley. In section two I have listed and discussed such parasites of the ground squirrels as I have secured to date. In the third section I have listed only the name, scientific name, type locality, distribution, and description of the Montana

rodents.

Measurements are given in millimeters unless otherwise noted.

I wish to express my gratitude to Dr. M.J. Elrod, of the Department of Biology at the University of Montana, and to Prof. M.H. Spaulding, Head of the Zoology Department at Montana State College, for their help in the making of this study; and to the students of the Clyde Park High School who were so active in bringing specimens for my study.

Order Rodentia

"This order, containing the gnawing animals, such as the squirrels, rats, and rabbits,* is very well defined, being readily characterized by the chisel-like incisors of both the upper and lower jaws and by the absence of canines.

Other distinguishing features are as follows: Feet plantigrade or semi-plantigrade, generally provided with five clawed toes; incisors growing continually during the life from persistent pulp, those of the upper jaw either four or two, those of the lower jaw never more than two; pre-molars reduced, usually only one above and below, arranged in an unbroken series with the molars, which may be rooted or rootless; the molars are always separated from the incisors by a definite space; skull with the orbit communicating freely with the temporal fossa and with the condyle of the mandible elongated antero-posteriorly so as to allow a backward and forward and also a small lateral movement of the jaw; clavicles generally present; cerebral hemisphere smooth and not overlapping the cerebellum; intestines usually with a large caecum; testes inguinal or abdominal; uterus two-horned; placenta discoidal and deciduate.

The rodents are mostly small animals of herbivorous habits adapted to terrestrial, aboreal, subterranean, or occasionally to natatorial life; the order contains a much greater number of species than any other; rodents are cosmopolitan, being found all over the world, though perhaps more abundantly represented in South America at the present day than elsewhere." (52)

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*Anthony does not include the rabbits in the Order Rodentia but places them in a separate order; Order Lagomorpha.

STUDIES ON THE FOOD HABITS AND ECONOMIC IMPORTANCE OF THE RODENTS FOUND IN THE SHIELDS VALLEY.

The Shields river is a small tributary of the Yellowstone river. It arises in the northern part of the Crazy Mountains and empties into the Yellowstone five miles east of Livingston, Montana. The Shields Valley through which the river and its tributaries flow lies wholly within the northern part of Park County, Montana. This valley is approximately 40 miles long and 20 miles wide.

Most of this study was made in the vicinity of Clyde Park, Montana, a small town located in the heart of the Shields Valley.

Marmota flaviventris nosophora (Howell) ---COLDEN-MANTLED MARMOT.

The common woodchuck found in the Shields Valley is M. f. mosophora. They are found almost everywhere and have their dens under abandoned buildings, under seldom disturbed board piles, or under granaries on ranches. It is a common occurrence to see one running into a culvert as a person drives along any road in the valley. They are very destructive to gardens and to clover fields. On June 9, 1934 I counted 14 in an alfalfa field. All were to be seen eating in a space no larger than the average city block. A number of farmers have told me that they consider them the most destructive animal found living near the ranches. Mr. George Riches, who lives

in the mountainous region of Brackett Creek (a tributary of Shields river) told me that he has a very difficult time raising any garden produce because of the constant depredation of these marmots. He stated that they ate so much clover and alfalfa in his fields that great bare places were left where all the green leaves had been consumed. Also they tread down alfalfa as they go thru it to and from their burrows. Occasionally they dig holes in the fields which are very dangerous to horses, and the dirt piles, thrown up when they dig holes in the hay fields, will dull and break the sower sickle when run into. Almost all the farmers in the valley keep a loaded .22 calibre rifle handy in order to destroy these animals. Some make attempts to poison them and to trap them but no organized efforts have yet been made.

Their flesh is considered palatable by some people, but considered disgusting by others. Several persons have informed me that it makes a delicious roast. Mr. George Mangun killed one, soaked the flesh in salt water over night and cooked it the next day. The members of Mr. Phil Gilbert's family, with whom Mr. Mangun was residing, ate and enjoyed it, believing it to be a rabbit.

Their fur has no commercial value.

According to Howell (30) the yellow-footed marmots produce from 3 to 6 in a litter; one female which I examined on April 29, 1934 was pregnant with 5 embryos in her uterus.

This species hibernates from the latter part of August or the first part of September until the latter part of March or the first weeks in April. A pet woodchuck of this species on the R.D. Noff ranch two miles northwest of Clyde Park, Montana, entered hibernation the latter part of October and did not reappear until April 16. Two marmots of the same species having a burrow under a wheat granary on the same ranch during the summer of 1935 were not seen after August 20. The first one I saw in the spring of 1934 was one I shot on April 5. However, the appearance of this species was reported as early as March 10.

Citellus richardsonii (Sabine) --- RICHARDSON GROUND SQUIRREL- FLICKERTAIL.

This animal is strictly a prairie animal. It always lives out in the open and never is to be found in wooded or bushy spots, except that it will dig its burrows under sagebrush clumps, when the sagebrush is found growing near cultivated areas. It is to be found in mountain valleys only where cultivation or forest fires have cleared off large tracts, beyond the limits of civilization it is not to be found.

Flickertails are strictly diurnal, being active from sunrise to sunset while the days are yet cool in the spring and when they begin to cool again in the fall. However, during the hot days of mid-summer they retire to their burrows during the heat of the day.

The flickertail is a true ground squirrel in that it spends the greater part of its existence below the surface of the soil. It digs its burrows everywhere, whether the land is extremely dry and hard, or swampy and soft, seems to make no difference. I have seen burrows dug in the rockiest of soil and in marshes. The burrow seldom drops straight down but more often slants inward at a fairly steep angle. In depth the burrow usually is dug six to eight feet below the frost line which fact accounts for the large mound of earth to be found at the opening of the main entrance, because each burrow has at least three openings.

Dr. Coues, in the American Naturalist, vol. IX, 1875, wrote one of the most complete accounts of the habits of Richardson's ground squirrel with which he became familiar when he was attached to the northern boundary survey along the forty-ninth parallel. This article as quoted by Bailey (8) follows:

> "It is one of the most abundant animals of our country, occurring by the hundreds of thousands over as many square miles of territory, almost to the exclusion of other forms of mammalian life. Millions of acres of ground are honey combed with its burrows . . . .I never saw any animals -- not even buffalo -- in such profusion. I have ridden for days and weeks where they were continuously as numerous as prairie dogs are in the populous villiages. Their numbers to the square mile are vastly greater than I ever ascertained those of S. beecheyi, the pest of California, to be, under the most favorable conditions. In a word, their name is legion. If Dakota and Montana were the garden of the world (which they are not, however) either the gophers or the gardens would have to quit . . . . Traveling among them, how often have I tried to determine in my mind what particular kind of ground, or what

special sites they preferred, only to have any vague opinion I might form upset, perhaps in a few hours more irding, by finding the animals as plentiful as ever in some other sort of a place. Passing over a sterile, cactus-ridden, alkali-laden waste, there would be so many that I would say 'this suits them best'; in camp that very night, in some low grassy spot near water, there they would be, plentiful as ever. One thing is certain however; their gregarious instinct is rarely put in abeyance. A few thousand will occupy a tract as thickly as the prairie-dogs do, and then none but stragglers may be seen for a whole day's journey.

Thier choice of camping grounds is however wholly fortuitous, for all that we can discover, and moreover the larger colonies usually inoculate . . . . If the animals have any preference, it is a choice of the lighter and more easily worked soils, rather than a question of location. They seem to haunt especially the slight knolls of the prairie a few feet above the general level. There the soil is looser, and the inhabitants have some little additional advantage in their views of the surrounding country. But there are planty of burrows in the heaviest soil of the creek bottoms. They dislike stony places for obvious reasons, yet they will often burrow beneath the single large rock. I have also found nearly horizontal holes of theirs dug from the face of an almost perpendicular bank. In short, there is endless diversity in the details of their habitations . . . There is one curious point in the socialism of these animals. Every now and then, in all out-of-the-way places, where there may not be another gopher for miles perhaps, we come upon a solitary individual guarding a well-used burrow, all alone in his glory. The several such animals I have shot all proved to be males; and what is singular, those old fellows are always larger than the average (some would weigh twice as much), particularly sleek and light colored and enormously fat. The earlier one I got I suspected to be a different species, so peculiar were they in many respects. I suppose they are surly old batchelors who have forsworn society for a life of indolent ease, though if I had found them oftener among their kind I should have taken them for the Turks of the harem. It seems to be a case somewhat parallel with that of the lonely old buffalo bulls so often met with away from the herd. The female brings forth in June. This I infer, at least, from the circumstance that July brings us plenty of young ones two-thirds grown. The young probably keep closely in the burrow

until they are about this size - I do not remember to have seen any smaller ones running about . . . .The gatherings and hoarding of seeds seems to be their principal occupation during the summer.

Amidst thousands that we pass only to see them skurry into their holes in trepidation, there are necessarily some observed which do not notice us or at any rate do not take alarm. I have often watched them, where the grass is taller than usual, gathering their store. They rise straight up on their haunches, seize with a peculiar jerk, they sit with arched back, and stow away their provender in their pouches with the aid of their forepaws. Their cheek pouches are not very large -both together would hardly hold a heaping teaspponful. When duly freighted they make for their holes. Their mode of feeding, as they do, upon grass blades or any other herbage, as well as upon seeds, is essentially the same. In their foraging excursions they seem to have regular lines of travel. From almost every long-used hole may be seen one or more little paths an inch or two wide, sometimes so well worn that they may be traced 15 or 20 feet. These paths often run from one hole to another. No matter how smooth the ground, these paths are never quite straight; they repeat in miniature the devious footpath across the meadow, the mysterious something that prevents an animal from walking perfectly straight being in force here. Though properly a vegetarian, like other rodents, the gopher is fond of meat, and I think that no small share of his summer's food is derived from the carcasses of buffalo. Wolves do not appear to be numerous, in summer at least, in this region, and the polishing of the buffalo skeletons is largely accomplished by the kit foxes, badgers, skunks, and gophers. Hard by a slain buffalo a badger's hole is pretty sure to be soon established, together with a number of temporary gopher burrows. In proof positive of this carnivorous propensity, I have more than once seen the inside of a drying carcass completely covered with the peculiar and readily recognized excrement of the gophers, while the bones and flesh were gnawed in a way that plainly told who had been there. . . . Comical as a gopher is in some of his attitudes and motions, he never looks so funny as when squeaking. He generally gets down on all fours to do it, drops his jaw with a jerk, and squeezes out the noise by drawing in his belly - it reminds one of a toy dog. If caught or wounded, they have an energetic chattering outcry, much like that of other species . . . ."

As a usual thing this animal hibernates from the last of August until the first of March, but the winter of 1933-34 was unusually mild inthe Shields Valley and a number of these animals evidently did not hibernate at all. On December 23, 1933 I saw one which had been run over and killed by an automobile on U.S. Highway No. 87 W. about eight miles south of Clyde Park. On warm days during January and February - 1934 and 1935 occasional individuals could be seen in front of their burrows almost everywhere throughout this valley. By the last of February numerous specimens were to be seen and by the second week in March the animals were out in great profusion. One interesting fact being that all of these animals which I shot in February and the first week in March in 1934 and 1935 were males. Altogether I shot 54 specimens during those weeks. The females not appearing until the middle weeks of March.

The testes of this rodent are abdominal except during the breeding season when they become inguinal. The uterus is two-horned.

Seton (47) found that the young are born in May and that the number varies between 11 and 6. However I found that the young were born in the first week in April. Females which I shot the second week in March were pregnant with the embryos about one millimeter long. During the first week in April I shot females in which the embryos were four centimeters

long from the tip of the nose to the tip of the tail, and were very much alive when I cut them out of the uterus of the dead females. Other females which I shot that week had already given birth to young because their uteri were empty but their milk glands were very much swollen. The young do not appear outside of the burrows until six weeks after birth, and are about one-fourth grown. The first I saw in 1934 were running around near the burrows on April 29. On that date I captured two by lying near the burrow and picking them up as they emerged. A female shot on the same date had twenty-two dandelion buds in her cheek pouches evidently carrying them to the young ones in her burrow. Only one litter is produced a year and from my observations it varies between 5 and 9 with an average of 6. One female examined had 11 embryos in her uterus.

The economic value of the Richardson ground squirrel is entirely negative, and is the worst pest of our valley. Because it is active during the warm months only its pelage is never heavy, and at no time is it attractive. The Skillman brothers who are taxidermists in Livingston, Montana state that the pelage has absolutely no market value.

The flesh of this animal is very distasteful to the palate because of its strong odor. Soaking it over night in a solution of salt and vinegar does not improve it as it does the flesh of much wild game. The odor of the meat while cooking is almost unbearable. Many of the early settlers

of this valley say that the Indians often ate the flesh and some of them recall a few white people who ate it when poverty prevented the obtaining of any other food. In the fall of 1931 it was rumored that people living in northern Montana were in such dire circumstances that they were canning the flesh of this animal for their winter supply of food. To date I have not been able to substantiate this story, and Mr. Andy Schultz of Helena told me that after thorough investigation he found it to be a hoax.

In examining the intestinal contents of this animal, I found that it occasionally eats grasshoppers, worms, caterpillars, and insects. However, these form only a small part of its diet, and any benefits received through the destruction of such pests is offset by the tremednous damages caused to crops by the flickertails themselves.

The flicertail thrives in a cultivated country. Previous to the sowing of wheat it had to live on the native vegetation, but when the land was broken and wheat planted then came the prosperous years for the flickertail. Bailey (8) quotes the following letter written by Mr. Rollin C. Cooper of Cooperstown, Griggs County, North Dakota:

> "Spermophilus richardsoni is present in great numbers and very destructive to small grains, doing most of the damage when the grain begins to head out and shade the ground fully; they then pull down the grain and cut off the upper part of the stalk for many rods around their holes, seemingly to let sunlight strike the ground; they do not like damp places and are more numerous on rolling then on flat ground. I farm 7,000 acres and I think I can rid my farm of gophers at little expense by using wheat poisoned with strychnine."

Under date of July 15, 1889 Mr. G.W. Sewell, of Rugby, North Dakota, describes the manner in which these squirrels destroyed crops in Pierce County:

> "We have here a gopher that is so destructive that we shall have to do something to protect ourselves or leave the country. I have lived in the grasshopper and chinch-bug countries; the gopher is worse than either. We have a fine stretch of land south of the Turtle Mountains, but the entire community is discouraged by the destructiveness of the gophers which seem to be native to this part of Dakota. They go into the ground in September and October and stay until the snow melts, say April 20. Then they come in great numbers and seem to be always starved; they will eat anything; grass, grain, meat, potatoes, onions, horse manure. When we commence working the land in spring they are all over the fields and eat the seed wheat. They come in from all the vacant land about and eat the wheat from the time it has sprouted until 2 inches high; then they eat the blades. By May 20 or the 1st of June they have a litter of about eight young. They destroy wheat, corn, beans, and dig out flax-seed and potatoes. They commence cutting down stalks of wheat about June 15 and continue to cut them until ripe; then they shell out the grain and carry it into their holes. They cut down the prairie grass when there is no grain. At certain times they eat each other when found dead. They are too numerous to count. They have destroyed from 60 to 80 acres of grain for me, and in some places have destroyed 60 per cent of the crop." (8)

The damage in this valley is extremely large. In the spring this rodent is ravenously hungry and it eats an enormous amount of winter wheat and young alfalfa. Then when spring grain is planted it eats that. In the fall it cuts down and stores away large amounts of ripened wheat. Just when this stored wheat is eaten no one seems to know, but when the squirrel first appears after hibernation it is as fat as when it disappears, My theory is that the wheat is eaten before the animal emerges in the spring.

Mr. Harry Richardson figured out that on his wheat ranch in 1933 these squirrels cost him $100.00 - $25 for poison and $75 in wheat eaten and stored away. Mr. Richardson's crop averaged 10 bushels to the acre with the price at 60¢ per bushel. On his 588 acres he estimated that a little better than twelve acres had been eaten away or so eaten that it did not pay to combine it.

Mr. Sam Queen also estimated his loss as averaging almost the same as Mr. Richardson's. Had the price of wheat been higher the losses would have been enormous. An estimate given out from the office of the County Agent for Park County places the average loss to each farmer at $50. With approximately 250 wheat farmers in Park County the cost is around $10,000.

All farmers try to control the ground squirrels on their cultivation by poisoning but it seems like a hopeless task when there is so much land uncared for on which these rodents lead a happy existence. To illustrate - there lives in this valley near Clyde Park a certain old bachelor who raises horses and cattle and some hay. All of his neighbors raise wheat and suffer from the depredations of the ground squirrels which live on his place. He will not put out poison for fear that some of his horses or cattle will eat it. The roadsides are happy homes for these pests also and it should be the duty of each county to place poison before every burrow along the roads.

To control the Richardson ground squirrel double-strength oats poison should be used. This can be obtained at cost from any county agent or from the Montana State College at Bozeman.

Eutamias amoenus luteventris (Allen) --- BUFF-BELLIED CHIPMUNK.

This is the species of chipmunk most commonly met with in the Shields Valley. A ride or walk thru the hills or along the streams will disclose numerous individuals. During the summer many of them will be found living in woodpiles or around granaries on ranches. At my father-in-law's ranch two miles northwest of Clyde Park two or three of these animals will spend the summer in the wood piles in the back yard. They eat the wheat which has been thrown out for the chickens. Some of the children on the ranches have them for pets. One boy about seven years old told me that he had three pet chipmunks until the cat broke into their pen one night and killed them. I have examined seven specimens which the high school boys shot right close to their homes and brought into my office. When they stay around the ranch house they become very tame. Many times I have had them running on the porch around me when I had grain to feed them. I have even had them climb over my clothes looking for grain. As long as a person remains very quiet and moves very slowly they do not take alarm but any quick movement sends them scurrying into

shelter. One cold frosty morning in the fall the hired man at my father-in law's ranch came in with a chipmunk which had evidently frozen to death in the woodpile. However in the warmth of the room it revived. By that evening it was very tame and would drink milk out of a teaspoon. A box was fitted up for it to live in on the porch as it was perfectly contented to dwell there. It stayed around on the porch and in the kitchen and never attempted to leave. A sack of wheat was kept on the porch for chicken feed so this chipmunk was able to get plenty of food. One morning after a very frostynight it failed to appear and investigation showed that it had frozen to death. When we examined the apple box in which it had been living we found almost a half bushel of wheat which it had carried in and stored. Too much prosperity killed it because it had neglected to carry in enough bedding while it was storing the wheat away.

In the wild state when they are found in brush clumps along the sides of streams they spend most of their time running over and under logs and rocks. Occasionally one may be seen in a tree but only in the lower branches. They do not seem to want to get very far off the ground.

When alarmed they scurry along uttering a series of squeaks and will rush to a log or other slightly elevated place where they can watch all sides. During this time they constantly keep up a "chipping." On the closer approach of the intruder they quickly disappear under a log or any

other object on the ground. When they do so they do not remain in one position but will hurry to other places of refuge always moving away from danger.

These animals must hibernate because they are never seen during the winter months, probably denning in burrows or hollow logs. I have made numerous inquiries but the only information I can gather is that "they den up somewhere." They hibernate rather late because they will be seen out on the early fall snows and will be seen on the snow of early spring. Howell (28) mentions numerous instances of hibernating chipmunks but says that observations are very scanty and records so few that little is known of the hibernating habits of these animals. In the instance of E. a. luteiventris he states that M.P. Skinner in the Yellowstone Park saw the first on March 22 and the last on November 3. During the last week of October 1933, I went on a hunting trip to the headwaters of Duck Creek in the Crazy Mountains and did not see a single individual, altho I had seen many of them in the same locality during the summer months.

The food of the E. A. Luteiventris according to my observation is mostly seeds, wheat, oats or other domestic grains, wild rose hipps, wild currants, choke cherries, juniper berries, buffalo berries, service berries, and huckleberries. I have also seen them catch and eat grasshoppers. If they eat bird's eggs I have not been able to find definite information as to this depredation. I have never seen them

eating them and no one with whom I have talked seems to either.

Economically they are not troublesome in this valley as the amount of grain they damage is negligible and though they do some scattered damage in gardens the amount is very small as compared with the damage done by ground squirrels and woodchucks.

Sciurus hudsonicus ventorum (Allen) --- WIND RIVER MOUNTAIN RED SQUIRREL.

This is the tree squirrel found in the Shields Valley. The members of this species being found in the Bridger Mountains on the west side of the valley, in the trees bordering the river and the tributary creeks, and in the Crazy Mountains on the east side of the valley. In the fall many of these squirrels are found around wheat granaries built close to the tree clumps and even may be found around granaries which are a half mile or more from trees. In August 1933 a half grown squirrel of this species appeared on my father-in-law's farm and I fed it nuts and sunflower seeds. One of the high school boys shot one in a tree on the bank of the Shields River which is the one I describe in the third section of this thesis. Mr. G.C. Goodwin, Assistant Curator, Department of Mammalogy, American Museum of Natural History, after examining a skin which a sent for his examination confirmed my identification of this species as S. H. ventorum.

On a hunting trip into the Crazy Mountains in October

1933 I saw four individuals and heard several more chatterint the timber. Their tracks were found everywhere in the snow going from trees to places where they dug pine cones out from caches under the snow. Coyotes were evidently hunting them as I followed coyote tracks that were intermingled with squirrel tracks. However, I did not find where any had been killed or devoured.

When alarmed these squirrels make a "chirring" noise which they keep up for long periods of time. When not alarmed they make a sort of "pleading" chirp. Their principal food seems to be the seeds of the lodge pole pine as I have seen them tearing the cones to pieces to get the seeds. The one at the ranch also showed a fondness for the ripe heads of the ox-eye daisy as I spent several hours watching it cut them off and carry them to the top of the garage to eat the ripe seeds. They also rob birds' nest to eat the eggs.

There are not enough of them in this valley to make their fur of commercial importance.

Glaucomys sabrinus bangsi (Rhodes) --- BANGS FLYING SQUIRREL.

This type of squirrel with its broad, laterial folds of skin which it used to glide from tree to tree is a night prowler and is seldom seen in localities where it is prevalent. I have not been able to obtain any specimens here in

the Shields Valley. A group of men who were cutting cottonwood trees for firewood in the river bottom in the winter of 1931 told me that two of them glided out of a hollow tree. Gordon Smith, a student in the Clyde Park High School, told me that one afternoon he saw two animals leave a hollow tree on the bank of Rock Creek. Because they seemed to glide to another tree he believed them to be flying squirrels. These are the only reports that I have been able to obtain of these animals occurring in this locality.

Thomomys talpoides bullatus (Bailey) --- SAGEBRUSH POCKET GOPHER.

This species is the one found in the Shields Valley. It is a small burrowing rodent seldom seen unless a person happens to see one pushing soil from its burrow. Its presence can easily be recognized by the characteristic mounds of dirt which it builds when it pushes the soil to the surface. When the snow melts in the spring long crooked rows of soil found on top of the ground shows that this animal has been busy all winter.

It is a very busy animal, constantly burrowing under ground in search of food. I have stood or lain very quietly down wind from the scene of fresh excavation and watched this animal pushing out dirt. The mound is circular surrounding the entrance and the dirt is pushed out into the center. As the dirt is pushed up the gopher is very careful about exposing itself. A fleeting glimpse may be seen of the snout

of the animal but that is all. These mounds are mostly found in pastures or in grazing lands. On the open slope about a mile south of the entrance to Rock Creek canyon in the Crazy Mountains over 100 mounds may be counted in an area containing about four acres. Some of the farmers who live in or near to the Bridger and Crazy Mountains told me that these animals destroy gardens by eating the root crops below ground. In this valley more damage is done in alfalfa and grain fields by the mounds of ground squirrels (C. richardsoni) and wood chucks (M. f. nosophora) than is done by pocket gophers.

These animals have a very surly disposition and live a solitary existence except at breeding times. When disturbed or pushed out from their burrows with a stick they will fight with such an attitude that one knows that they are "mean". They chatter their teeth and give small short grunts and with their long front claws, and short muscular forearms they scratch and push with considerable force, and if given a chance will give a severe bite.

Their eyes are very small and almost hidden in the fur of the head. Their short, almost naked tail must be very sensitive because their tunnels are not large enought to allow the animals to turn around. Thus in moving back through the tunnel they must guide themselves by moving the tail from side to side.

Their natural enemies are hawks, owls, weasels, coyotes and badgers.

Castor canadensis missouriensis (Bailey) --- MISSOURI RIVER BEAVER

"Beavers are compact, heavy-bodied animals, with strong frames and powerful muscles. They have broadly flattened, naked tails, and dense coats of find, soft, waterproof underfur, hidden by coarse outer guard hairs. The underfur varies locally from buffy yellow to brownish black, and the coarse outer hairs vary from light brown to dark chestnut.

The hind feet are large, and the five long toes are fully webbed for swimming, the two inner toes on each foot being provided with remarkable double combing claws. The front feet are small and unwebbed and are used mainly as hands for holding food or carrying and handling building material, or as feet in walking. The eyes are small, and the vision evidently is not very keen except under water. The ears are short, fur lined, and valvular, closing as the animals dive and opening instantly as they come to the surface, and the sense of hearing is remarkably keen. The nostrils are small and valvular, closing under water and portecting the extensive nasal cavities back of them, and affording a keen sense of smell. The mouth, with hairy lips closing perpendicularly back of the broad, protruding, chisel like incisors, also is valvular, so that the water can not enter it when the teeth are used in cutting or tearing up roots or sticks below the surface. The molars, or gridding teeth back of the lips, can be used for chewing while the lips are close in front of them to keep out water.

The genital organs also are well protected from the water, being wholly concealed under the skin and opening into the cloaca. Into this same cloaca opens a pair each of large musk glands, and oil glands lying under the skin of the belly just in front of the opening, in males at the sides of the penis.

Externally the sexes are not easily distinguished except that adult females have four conspicuous mammae arranged in a peffect square, two borne on each of the elongated mammary glands lying between the front legs. The stomach and intestines will accomodate large quantities of coarse food, and the liver is of unusual size and has large cavities that serve as a reservoir for storing oxygenized blood, a character that probably enables the beaver to remain under water for an unusual length of time." (5)

Beavers are the largest of North American rodents some species attaining the weight of 60 pounds or more. They are famed for their industry and to say that a person "works like a beaver" is considered a compliment.

They are more adapted for life in the water than on land. They are powerful swimmers, moving thru the water with ease and grace using their webbed hind feet and broad tail as means of locomotion. On land they are slow and clumsy and an ordinary person can easily outrun them. As a result beavers seldom are found more than 40 or 50 feet from water.

In cutting trees a small tree is usually cut thru from one side, but larger ones are cut thru from two sides. With their powerful incisor teeth the beavers cut out chips above and below as is done with a woodsman's axe. The tree usually falls toward the water because that is the direction the ground slopes and the trees usually lean a trifle in that direction. Bailey (5) states that one old beaver in one night can cut down a poplar tree 3 or 4 inches in diameter, cut it up into sections 4 to 8 feet long and drag them into the water. To cut larger trees it will often take them several nights and when felled will keep a colony busy for a week cutting off branches and sections of the trunk and carrying them into the water. Tree stumps as large as 2 feet in diameter are occasionally seen where the beavers have been at work. The largest stump seen by Bailey was a balsam poplar in Montana 46 inches across.

Their favorite food trees are: poplars, cottonwoods, willows, birches, alders, bush maples, and service berry bushes. Conifers are seldom cut for food unless no other trees are to be found. These latter when cut are usually used for dams.

These animals do a lot of digging under water to obtain mud for their dams and houses and to deepen their ponds. They also dig channels thru which they tow tree trunks. They seldom if ever dig burrows on the surface of dry ground.

In building dams beavers always work from the upstream side. Twigs, leaves, stones, grass, etc., are laid across the stream against some natural obstruction. Then as the water rises sticks are placed on top and criss-crossed and held in place by mud and stones. The transporting of large tree trunks and stones by beavers is the most amazing ability of this wonderful animal. In transporting tree trunks they hold it with their incisor teeth and with the head to one side drag or tow it to the desired place. Sometimes in the water a log is grasped by the arms while the beaver swims at the side steering itself by means of its tail.

Beaver houses are built by first laying a foundation of weighted sticks and stones on the bottom of the pond. Then whenever the water level is reached construction is continued upward until a room is constructed above water line. This is usually thick walled and when frozen in water will resist the attack of bears, or any other animals which may try to

dig thru. The inner chamber is usually 3 to 5 feet across and contains a hole in the floor which is used as a means of entrance or exit. This opens up usually 15 or 20 feet away on the bottom of the pond thus providing a safe means of entering or leaving.

Young beavers are usually born in May or June.

Beavers signal and communicate with each other by slapping the surface of the water with their broad tail.

Economically beavers cause some damage by cutting down trees and by damming up streams which causes the water to flood tree roots and drown them. Then there is the other side of the picture which more than balances the damage done, because these dams hold the spring freshets back and therefore are a means of flood control, the ponds serve as spawning ponds for fish; and their fur is very valuable. It is this last fact that has led to the virtual extermination of the beaver. At one time the members of this genus were found in almost all of the streams of the United States, but at the present time they are found in only scattered colonies. Strict laws are now in force to protect them against further depredations.

Beaver dams are found all along Brackett Creek and Shields River. During the summer of 1933 one dam had to be torn out four times in order to allow enough water to flow thru an irrigation canal which starts in Shields River about two miles south of Wilsall, Montana. Every year farmers on

whose land beavers have their dams find it necessary to apply for permits to trap these animals in order to prevent their arable land along the Shields River being flooded. Most of the skins thus obtained are sold, but some are made into coats by the trappers. Sportsmen in this locality wish to protect the beaver because their permanent dams form excellent fishing grounds.

Peromyscus maniculatus artemisiae (Rhodes) --- SAGEBRUSH WHITE-FOOTED MOUSE.

This is the representative of the genus Peromyscus in the Shields Valley. Here it is locally called the "deer mouse." Its preferred habitations are burrows in the earth under fallen logs, piles of brush, rock piles or other shelters. Anthony states that it is a strictly nocturnal animal but I have often seen individuals venture out into rooms of ranch houses during the day. It is active all year long. In the summer and fall its tracks may be seen in soft dirt and during the winter in the snow.

It is strictly vegetarian, its food consisting mostly of seeds of grasses.

In making this study of rodents I asked the students of the Clyde Park High School to bring me all mice that were caught in traps at home or were killed around the barns. Altogether there were eighteen P. m. artemisiae (Rhodes) brought to me. This was more than twice as many as the

common house mice caught. In a house in Clyde Park we caught two M. m. musculus in the pantry and three of the P. m. artemisiae. When they move into dwelling places in the fall they are very tame and often will venture out into the rooms during the day to run around. I have placed bread crumbs on the floor and had them come up within a few feet of my feet to eat.

They are very pretty animals with their white undersides and grayish tan upperparts, with their large ears and twinkly black beady eyes.

Neotoma cinerea cinerea (Ord) --- GRAY BUSHY-TAILED WOOD RAT.

In the Shields Valley as in all of the Rocky Mountains the wood rat is a very common rodent. In many places they build nests of sticks and other debris in the clefts of cliffs. However they do not live in the nests out in the open, but will have other refuges deep down in the rocks. They never become as much of a house dweller as the Norway rat, but often take up quarters in barns, houses on ranches, and in cabins. In any dwelling they become a nuisance, not because of the food they destroy, but because of the noise they make at night. One rat can make enough noise to make a person think that another human being is present. They will thunk things on the floor, run around over the roof or

thru the attic, rattle the wood in the wood box, and generally keep up a racket all night. Also they are a nuisance because of their odor, and because they will carry away all sorts of bright or metallic objects. It is due to this latter habit that they have earned the name of "pack" or "trade" rats. Many stories are current of their clever trading and most of them are exaggerated thru constant telling. My opinion in regard to their trading is that they are carrying some object that had appealed to their fancy when they discover another. So they drop the first object and start off with the new and carry it along to their nests or until some other object attracts them.

They are attractive looking animals with their silky gray fur and long bushy tails. Their eyes are large and lustrous, and mischief seems to lurk in them. They are always clean in appearance and would probably make nice pets if they did not have such an odor about them.

They are active all the year.

Their fur is soft but has no commercial value. Anthony (2) says that some of the western Indians eat them, but I have never known of any one to try them. One smell of the characteristic odor is enough to make even a hungry man hesitate.

Microtus pennsylvanicus modestus (Baird) --- SAWATCH MEADOW MOUSE.

This is the most common Meadow Mouse of the Shields Valley, being found in all the hay fields and meadows. If the hay is allowed to stand in shocks for any length of time three or four will usually be seen as the hay is moved. At any time in the timothy fields or in the meadows the runways of these mice can be found.

Farmers kill every one they see because during the summer these mice build nests above ground in the dense growth of hay, then when it is cut with a mower these nests clog up the sickle and at times even break the blades. I have known farmers who would not permit anyone to kill a garter or bull snake on their farms because these snakes prey on Meadow Mice.

In September 1934, Philip Holliday, a student of the Clyde Park High School, brought me a young one which was nestling in a hollow eaten into a potato. This specimen was found while harvesting the potato crop on his father's ranch. This shows that potatoes can be part of the diet of this species.

Ondatra zibethica oscyoosensis (Lord) --- ROCKY MOUNTAIN MUSKRAT.

This rodent is found in the streams throughout the width and breadth of the Shields Valley. Many men spend

the winter trapping them and selling the hides thus obtained. A fishing trip along Shields River will disclose numerous signs of these animals and occasionally one will be seen swimming in the river or in the ponds which are found on each side of the river. About four miles south of Clyde Park, Montana, the U.S. Highway No. 87 has been built thru a swampy piece of land. Just before the road rises out of the swamp on the southern end it passes alongside a cat-tail pond, which is inhabited by muskrats. They are seldom seen by people hurrying past in automobiles, but every fall at least four small and large muskrat houses can be seen in the center of the pond. Each fall they are repaired and rise higher in the air. These houses are built much in the same fashion as the beaver houses already described.

The muskrat is a very pretty animal when its coat is prime. The soft plumbeous underfur and the long black or dark brown hairs lying on top of the underfur give it a beautiful appearance. The long slim and almost naked tail seems odd when the rest of the animal is so well protected against the chill of the water.

These rodents will migrate from one body of water to another during the summer and will sometimes be found on dry land many miles from water. Mr. Skillman, a taxidermist of Livingston, Montana, told me that several years ago he happened onto one which was travelling thru a road which

was about four inches deep in dust and a good five miles from water. Other men have told me of the same phenomenon.

Mr. Skillman says that in making up muskrat hides for coats that usually all the hides should be obtained from the same locality; otherwise there will be enough variation in the fur coloration to cause an enormous amount of waste in matching.

Zapus princeps princeps (Allen) --- ROCKY MOUNTAIN JUMPING MOUSE.

This species is common in the hayfields and along the tributary creeks of the Shields Valley. As a person walks along the banks of the creeks or thru the hay meadows every so often one of these mice will skip away out of danger. They are very quick in their movements and soon disappear out of sight. Occasionally one will appear around a ranch house in the fall. I know of two instances where individuals have been found drowned in refuse pails. Evidently hunger had driven them to try to hunt for food away from their accustomed haunts.

It is a beautful sight to see them moving very rapidly thru the grass by means of long jumps.

These mice hibernate in cold weather.

Erethizon epixanthum epixanthum (Brandt) --- YELLOW-HAIRED PORCUPINE.

The porcupine is a large clumsy, slow moving rodent which may be recognized anywhere by the sharp quills found in the long coarse hairs of its pelage. So secure is the porcupine in the defense it maintains with these quills that it does not make any effort to get out of the way of any animal. Ordinarily the quills are hidden in the stiff coarse hairs but when aroused the animal erects the quills and starts switching its heavy tail.

The tail is a very effective weapon. It is thick and muscular and covered with quills. If a dog, horse, hog, or any animal approaches too close the porcupine will give a quick flip of its tail into the face of the disturber leaving its skin full of quills. The quills are loosely fastened to the skin of the porcupine but the end driven into the intruder is barbed and when once driven in they are difficult to remove. In fact it is usually necessary to use pliers to pull them out. The story of these animals throwing their quills is pure fiction.

The porcupine has an inordinate craving for salt and will gnaw up boards or anything containing a trace of this mineral. When sheepmen build salt logs in the mountains for the benefit of their flocks they have to keep replacing these logs because the porcupines entirely destroy them.

This craving for salt furnishes a means of control because by mixing salt and strychnine all porcupines in a locality can be exterminated.

Economically these animals do considerable damage in hay fields and in forests. In the hay fields they eat some alfalfa but their greatest damage is in the fact that they flatten down so much of the hay as they move thru it. In the Shields Valley they are often found in the alfalfa fields and a large number are cut up by the mowing machines every year.

In the forests they are a nuisance because they kill trees. Their fall and winter food consists of the bark and leaves of coniferous trees. Often they will strip off enough bark to completely girdle a tree and thus kill it. A trip thru the Crazy Mountains is revealing as to the damage wrought by porcupines when the number of trees which have been barked is noticed.

PARASITES OF GROUND SQUIRRELS

During the summer and fall of 1934 and the spring of 1935 I collected the parasites of Columbian (C. columbianus), and Richardson (C. richardsonii) ground squirrels. The Columbian ground squirrels were collected in the vicinity of Missoula, Montana, and the Richardson ground squirrels were taken from the vicinity of Clyde Park, Montana.

Externally the animals are parasitized by fleas, lice, and nymphal wood ticks. Internally they may harbor nematodes and cestodes.

Every animal taken was heavily infested with fleas. Altho the species of flea living on each species of ground squirrel differed they both belonged to the genus Ceratophyllus. However I was not able to determine the exact species.

These fleas were recognized as belonging to the genus Ceratophyllus from the key given by Baker (10-11). The females had the three characteristic antepydidial bristles of each side, and the heads of both sexes were without ctenidia.

On almost every ground squirrel of either species taken, one or two lice were found fastened just behind the fore legs or just in front of the hind legs. The hair is thinner in the axillae and these spots are well protected. Whenever found, these lice are tightly fastened to the skin,

evidently they cling to a hair to hold themselves in place, because when one is pulled loose a hair is always held in its claws.

According to Ferris (19) this species of louse is Nachaematopinus laeviusculus (Grube). In the first place the hosts were typical because the hosts of N. laeviusculus (Grube) are the Sciurids, e.i. ground squirrels (Citellus), woodchucks or marmots (Marmota), and priarie-dogs (Cynomys). Then in the second place these lice were identified by their characteristic sternal plate which is shown in the accompanying plate. Also the spiracles of the species taken were very small which is characteristic of the above species of rodent lice.

The only external parasites which I found to be common to both species of ground squirrels were nymphs of the Rocky Mountain Wood Tick - Dermacentor venustus Banks. Every animal was heavily infested with these parasites which is a startling reminder that ground squirrels are among the hosts of this spotted fever tick. The extermination of the ground squirrels will eliminate most of the nymph tick hosts and thereby lessen the danger of spotted fever infection.

Internally both species of ground squirrels were hosts to parasitic intestinal worms.

In the duodenum of the Richardson ground squirrels I

found infestation with a species of nematode. The infestation varied from around 20 in one case to only 1 in another. These worms were all taken from material which I had preserved in formalin and the worms were twisted into such tight spirals that it was very difficult to straighten them out or to untangle them for study.

I identified this nematode as the one described by Sleggs (48) which he named Warrenius bifureatum, but Manter (85) has since suggested that the correct name should be Cittelinema sleggsi. This nematode was exactly as described by Sleggs, because the head showed the cervical wing, the striations of the cuticle, the rays of the bursa and shape of the spicules in the male; the correct location of the ovary and uterus, and the spine on the end of the tail in the female.

In the posterior portion of the small intestine of two Columbian ground squirrels (C. columbianus) I found tapeworms. These cestodes were also taken from preserved material and were so knotted and twisted that they were difficult to study. However, after studying stained whole mounts and sections I am satisfied that this cestode belongs to the Family Anoplocephalidae, Genus Cittotaenia, because the scolex is unarmed, without a rostellum, and the suckers are unarmed. The segments are broader than long. There is a double set of reproductive organs in each segment. The

genital pores are bilateral. The testicles are numerous. The uterus is double and transversely elongated. The vagina is ventral to the cirrus pouch on both sides of the segment.

Since making the above study of the tapeworm found in C. columbianus I have taken two C. richardsonii here in the Shields Valley which were hosts to cestodes of the genus Andrya.

In three cases I found Columbian ground squirrels suffering from coccidial infestation. The oocysts were in the liver tissue and caused that organ to appear somewhat lighter than its normal color. The oocysts were arranged in thread-like processes easily visible to the unaided eyes. In one case the liver was greatly elarged and the infestation was particularly heavy. I found no evidence that the parasite had attacked the wall of the intestine.

This parasite belongs to Class: Sporozoa: Order: Coccidia; Suborder: Eimeriidea; Family; Eimeriidae; Subfamily: Eimeriinae; and Genus: Eimeria. (53)

However much work has yet to be done in this family in order to identify all members. I found records in Wenyon, (53) and Andrews (1) of the Eimeria found in such rodents as rats, mice, marmots, prairie-dogs, and in closely related hares and rabbits, but no record of any taken from ground squirrels. Andrews found by experimentation that the Eimeria are host specific, so there may be a possibility that these Eimeria are specific in the Columbian ground

squirrel. That, however, is a problem of the future.

The oocysts which I found in the ground squirrel liver more closely resemble the plate on page 837 in Wenyon (53) of Eimeria stiedae than that of any other plate or drawings in that publication.

Since making the study of the coccidial infestation of C. columbianus I have taken 32 C. richardsonii on Cottonwood Bench, about 8 miles northeast of Clyde Park, Montana, and found that every one was heavily infested. Ground squirrels taken from other localities in the valley did not seem to be infested at all.

THE RODENTS OF MONTANA

Family Sciuridae

This family is described by Anothony (2) as follows:

> "Form varying from slender to robust; size small to fairly large; head rounded; tail without scales, short to long, usually flattened, well haired; cheek-teeth at least four on each side; molars rooted, tubercular; ribs twelve to thirteen pairs; clavicles developed; habit terrestrial, fossorial, or arboreal."

Subfamily Sciurinae

Genus Marmota

Monax Group

Marmota monax petrensis (Howell) --- BRITISH COLUMBIA WOODCHUCK.

Type locality. - "Revelstoke, British Columbia, Canada." (37)

Distribution. - "Interior ranges of southern British Columbia and adjacent parts of United States, from Barkerville, British Columbia, south to Thompson Pass, Idaho." (30)

Description. - The long hairs of the pelage are blackish brown tipped with white or pinkish buff. The underfur of the upper parts is of a blackish brown at the base succeeded by a pinkish cinnamon; the top of the head is brown; sides of the head buff; the feet and legs black; the legs and thighs overlaid with burnt sienna; tail blackish brown; underparts tawny and often slightly mixed with black. (30)

Measurements. - "Total length, 540; tail vertebrae, 127;

hind foot, 76, Adult female measurements: total length 505; tail vertebrae, 125; hind foot, 68." (30)

Caligata Group

Marmota caligata nivaria (Howell) --- MONTANA HOARY MARMOT.

Type locality. - "Mountains near Upper St. Mary's Lake, Teton Co., Mont. (altitude 6,100 ft.)." (37)

Distribution. - "Upper slopes (at and above timberline) of high mountains of northwestern Montana and of Bitterroot and Salmon River Mountains, Idaho (limits of rangeq imperfectly known)." (30)

Description. - "Adults: Fore part of back (to middle) snowy white, sparingly grizzled with black, the under fur hair-brown; hinder back pinkish cinnamon or cinnamon-buff mixed with black and white, the underfur bone-brown; top of head black, mixed with white and with a large white patch acorss face in front of eyes; sides of face brownish, mixed with white and cinnamon buff; forefeet black with white patches; hind feet black, more or less mixed with cinnamon; underparts white, sparingly mixed on abdomen with cinnamon buff; tail above, mixed pinkish cinnamon and chestnut brown; beneath clove brown or blackish brown. Young (specimen from Elk Summit, Idaho): Nearly pure white above, shading to cinnamon-buff on hinder back; the underfur dark mouse gray; tail cinnamon-buff fringed at tip with blackish brown, the

bases of hairs hair-brown; feet and tip of head fuscous-black." (30)

Flaviventris Group

Marmota flaviventris nosophora (Howell) --- GOLDEN-MANTLED MARMOT.

Type locality. - "Willow Creek, 7 miles east of Corvallis, Ravalli County, Montana. (Altitude 4,000 feet.)." (30)

Distribution. - "Rocky Mountain region of Montana, Idaho, and Wyoming, from Flathead Lake, Montana, south to the Wasatch Mountains, Utah, and east to the Big Horn Mountains, Wyoming; altitudinal range from about 3,000 to 11,800 feet." (30)

Description. - "Underfur of upperparts of base blackish brown on fore part of body, becoming fuscus on hinder parts, succeeded by a broad area of whitish buff (Tilleul buff of Ridgway) shading (on hinder back) to pinkish cinnamon or pale russet; long hair black subterminally, broadly tipped on forepart of back with warm or ochraceous-buff and on the hinder part with white or buffy white; top and sides of head blackish-brown, with a conspicuous band of white or buffy white across face in front of eyes; sides of face mixed with cinnamon or white; sides of nose, lips, and chin white or buffy white; sides of neck with ochraceous-buff patches behind ears; fore legs chestnut-brown or blackish brown, varied with hazel shaded with haiser brown, becoming bright chestnut on throat and sometimes on belly." (30)

Measurements. - "Adult male: Total length, 595; tail vertebrae, 165; hind foot, 78.5. Adult female; Total length, 565, tail vertebrae, 165; hind foot, 78." (30)

Genus Callospermophilus

Callospermophilus lateralis cinerascens (Merriam) --- MONTANA MANTLED GROUND SQUIRREL

Type locality. - "Helena, Lewis and Clark County, Montana. Altitude 4,500 feet." (37)

Distribution. - "From Yellowstone Park north thru Montana and Idaho into Alberta." (2)

Bailey (9) found them in Glacier National Park at Summit, St. Mary's Lake, Flattop Mountain, Gunsight Pass, Piegan Pass, Many Glaciers, Waterton Lake, and at Many Glaciers Hotel.

Description. - Dorsal region grayish; mantle reddish in winter, chestnut red in summer, tail above, mixed black and pale buff, below, pale buff; underparts darkish white; outer side of hind limbs pale brown. (2)

The chief characteristic of the pelage of this ground squirrel group is the mantle and stripes. The mantle is an area comprising the top of the head and sides of the neck on which the hairs are of a deep or chestnut brown. The stripes are found extending from the shoulders to the thighs. The first lateral stripe is white and is sharply defined; below

this first white stripe is found in this species a short black stripe, then below this black stripe another light stripe which blends into the color of the underparts.

Measurements. - "Total length, 11 inches; tail vertebrae, 3.8 inches; hind foot, 1.6 inches." (2)

Genus Citellus

Citellus columbianus columbianus (Ord) --- COLUMBIAN GROUND SQUIRREL.

Type locality. - "Camas Prairie between the forks of the Clearwater and Kooskooskie, about 40 miles from Moscow, Lincoln County, Idaho," (87)

Distribution.- "From western Montana to eastern Washington and Oregon north to western Alberta and southern British Columbia." (13)

Description. - (Specimen trapped in the Forestry gardens on the campus of the University of Montana.) Upperparts spotted yellowish, black, and gray from shoulders to tail; top of head and neck gray; nose, sides of fore and hind limbs rusty red, hind limbs darker than fore limbs; tail above rusty first quarter of the length, balance spotted black, gray and white, the hairs banded with black, white and buffy; underpart of tail mixed rusty, gray, black, and white, black predominating. Underparts rusty under chin to base of forelegs; and at base of tail; from forelegs to hind legs mixed gray, buffy, white and black.

Measurements. - "Total length, 15 inches; tail vertebrae, 4.2 inches; hind foot, 2.2 inches." (2)

Citellus armatus (Kennicott) --- UINTA GROUND SQUIRREL

Type locality. - "Foot hills of the Uinta Mountains, near Fort Bridger, Uinta County, Wyoming." (2)

Distribution. - "Foothills and mountains of Wyoming, Montana, Idaho, and Utah." (2)

Description.- "A medium-sized, short-tailed squirrel with fairly soft pelage. Upperparts mixed gray and black with wash of dark brown on dorsal region; brighter on shoulders and thighs; tail above and below mixed gray and black, banded with black and fringed with grey; underparts gray washed with buffy." (2)

Measurements. - "Total length, 11 inches; tail vertebrae, 2.5 inches; hind foot, 1.8 inches." (2)

Citellus richardsonii (Sabine) --- RICHARDSON GROUND SQUIRREL: FLICKERTAIL.

Type locality. - "Carlton House, Saskatchewan, Canada." (37)

Distribution. - "Found from southern Saskatchewan and Alberta to Montana and North Dakota; in North Dakota found north and east of the Missouri River." (2)

Literature on the distribution of this ground squirrel seems to be scanty. Most of the sources that I have found are old and do not give correct data on the present day

habitat. For instance Preble (43) gives the following: "East of the mountains Richardson's ground squirrel seems to be confined in Montana to the extreme northeastern part of the State. We have records from Johnson Lake, north of Culbertson; Culbertson; Poplar; and Glasgow, in the valley of the Missouri River."

Bailey (8) found its range restricted to Montana and North Dakota. In Montana ranging from the Rocky Mountains eastward and not recorded as being found south of the Missouri River.

From my personal observation, study and inquiry, I find that this species is found from the Continental Divide eastward between the 45th and 46th parallels to Livingston and Gardiner; then eastward along the Yellowstone River to Billings; then north of the Yellowstone River on the east side of the Continental Divide to Glacier Park and southern Alberta and Saskatchewan, including central Montana between the Yellowstone and Missouri Rivers. North of the Missouri River it is found from Glacier Park eastward to the Red River in North Dakota.

People who have lived in the Shields Valley since the early '80's all are positive that these ground squirrels were present in great numbers even before the land was broken for wheat cultivation. Thus Bailey and Preble seem to have been in error on the exact distribution.

Description. - This ground squirrel closely resembles a prairie dog but is only about half the size. Its color is a rich yellow buff on the underparts and on its legs. The upperparts are darker due to a mottling of black; its back is covered with a variegated pattern of small buffy and black spots. Taken as a whole it is not a pretty animal. Variations of the above coloration are usually the presence of white instead of yellow buff, and albinism. I have examined three specimens of the first variation, and in the summer of 1933 the children of Mr. C.J. Atkins had five pet ground squirrels which were albinos.

The ears are very small and the tail is short.

This animal is called the "flictertail" because when it sits in front of its burrow and gives its thin, squeaky, "bark" it flicks its tail with a short quick jerk. In running the flickertail runs a few steps and then rises abruptly on its hind legs, evidently to see the ground ahead, then it drops down, runs a few feet and then rises again. During the entire running the tail is held stiffly erect.

It has four toes and a very rudimentary "thumb" on its front foot and five toes on its hind foot. Each foot bears four tubercles.

Measurements. - "Total length, 237; tail vertebrae, 73; hind foot, 45." (4)

Tridecemlineatus Group

Citellus tridecemlineatus pallidus (Allen) --- PALE STRIPED GROUND SQUIRREL.

Type locality. - "Plains of the Lower Yellowstone River, Montana." (37)

Distribution. - "From Montana and southwestern North Dakota southeast to Kansas and south to western Texas and eastern New Mexico." (2)

Description. -". . .; ground color of upperparts chestnut sparingly mixed with black, the light markings creamy white, the light stripes nearly as wide as the dark ones; pelage of underparts pale yellowish white to base." (2)

This group is characterized by many dark and white stripes alternated on the upperparts. The dark stripes on the back are spotted with white, but on the neck and shoulders these stripes are solid, not being broken by spotting.

Measurements. - "Total length, 9 inches; tail vertebrae, 3 inches; hind foot, 1.3 inches." (2)

Genus Cynomys

Subgenus Cynomys

Cynomys ludovicianus ludovicianus (Ord) --- BLACK-TAILED PRAIRIE-DOG.

Type locality. - "Upper Missouri River ("vicinity of the Missouri, and thruout the greater part of Louisiana"). (37)

Distribution. - "Great Plains region of the western United States, south from near the Canadian border in Montana to west central Texas (Mason County to eastern Pecos Valley); east to about the ninety-seventh meridian in Nebraska, Kansas, and Oklahoma; west to the Rocky Mountains in central Montana. Wyoming, and Colorado, and in extreme eastern New Mexico. Chiefly Upper Sonoran, but also ranging into Transition and Lower Sonoran Zones. Introduced colonies exist, or have been reported as formerly existing, in Sac County and in Burlington, Iowa; near Monroe, Louisiana; at Seneca, South Carolina; and on Nantucket Island, Massachusetts." (26)

Description. - "A heavy-bodied, robust, terrestrial Squirrel, short-tailed, social in habit, and with characteristic 'bark!' About the size of a small woodchuck; head broad and rounded; ears low and rounded; body stout; tail very short, well haired but flat; legs short, wrist and heel well furred, with a tuft of hair in center of palm; forefeet with five claws; mammae 8 to 12; cheek-pouches present; pelage rather coarse; iris hazel." (2)

Color. - "Adult in full fresh summer pelage: Upperparts from nose to between eyes, between ears, nape, and over entire body above, dark pinkish cinnamon, finely lined with black and buff. Individual hairs black at base, followed by buffy white, then cinnamon, with subterminal band of buff, and, in unworn condition, narrow tip of blackish. Mixed with these are numerous wholly black andhalf black streaking. Upper lip, sides of nose, and eye ring buff or buffy white; whiskers black; cheeks and sides of head buffy or vinaceous-cinnamon, with numerous blackish hairs; arms above, sides of body, and legs above pale ochraceous-cinnamon; terminal third

chiefly black or blackish brown above and below, with extreme tip of lighter blackish brown. Underparts of body from chin to near tail whitish or buffy white. Nails blackish, tipped with light horn. Iris hazel. Adult in full fresh winter pelage: Pelage much thicker, softer, and longer than in summer coat; less ochraceous or pinkish cinnamon, more buff and gray. Upperparts grayish cinnamon (mixed pale cinnamon, whitish, and black). Individual hairs intense black at bases, then pale buff, with subterminal band of cinnamon and tip of almost pure white. Mixed throughout this pelage, as in the summer coat, are numerous long overlying hairs of black. Forehead with considerable blackish; tail as in summer. Underparts dark buff or pale cinnamon, the hairs black at bases, whitish midway, and broadly tipped with pale cinnamon-buff. Juvenile pelage: Upperparts clear ochraceous-cinnamon, with admixture of a few white and blackish hairs; underparts whitish or pale buffy yellow; tail clear ochraceous-cinnamon, broadly penciled with black; bases of many of the black pencil hairs pure white.

Both the summer and the winter coats rapidly fade and wear, and the resulting variations in color are considerable. Specimens are frequently greatly affected by the color of the soil, and numerous examples are considerably reddened or darkened by stain, either on the upper and lower body or uniformly throughout the pelage. Specimens in complete fresh summer coat are rather uncommon as the vernal molt is so slow that the forward parts, renewed first, are already considerably worn before the tail, last to renew, is in full fresh coat." (26)

Subgenus Leucocrossuromys

Cynomys leucurus (Merriam) --- WHITE-TAILED PRAIRIE DOG.

Type locality. - "Fort Bridger, Uinta County, Wyo. (37)

Distribution. - "Irregular areas in the mountainous parts of Montana, Wyoming, Utah, and Colorado. South from the Bighorn Basin, in southern Montana, across central and southwestern Wyoming into western Colorado and northeastern Utah; east to the Laramie Mountains, Wyoming, and into

Northern Utah and farther south, into the Green River Valley. Chiefly Transition Zone." (26)

Description. - Resembles a ground squirrel (citellus) more than does C. ludovicianus. Tail tipped with white. More of a mountain dweller than C. ludovicianus which is a plains dweller.

Description. - "Adult in fresh summer pelage: General color of upper parts yellowish buff, streaked with blackish. Nose yellowish buff, unmarked; spot above eye and large area on cheek dark blackish brown; ears pale cinnamon. Top of head to center of tail uniformly mixed pale cinnamon-buff or yellowish buff and blackish; the individual hairs black at bases, then light grey, then pale cinnamon, with sub-terminal band of buff and, in unworn condition, tip of blackish. Limbs, feet, and underparts clear buffy; nails blackish, tipped with light horn. Tail white, the hairs of proximal half above with bands of blackish, below pale cinnamon; distal half clear white. Adult in fresh winter pelage: Decidedly darker than in summer; more blackish above, especially posteriorly; the buff tints richer in tone and the dark areas on head considerably spread out, less sharply defined. There is a heavy underfur of grayish white, but the bases of all the flanks lighter, more grayish than black and rump. Juvenile pelage: Above grayish brown; below paler grayish; supraorbital spot of brownish black sharply marked. Post juvenile pelage: Specimens in first fresh autumnal coat darker than adults, more reddish, and hairs of upperparts more heavily tipped with blackish.

Adults in the faded, left-over winter coat are often very yellowish above, with little or no black streaking from the hair tips. Many specimens in various stages of molt and renewal present strange combinations of color. Examples deeply stained by color from the soil are frequently noted." (26)

Measurements. - "Averages of 13 adult males from Wyoming: Total length, 358; tail vertebrae, 57; hind foot, 62." (26)

Genus Eutamias Trouessart

Subgenus Eutamias

Eutamias Minimus Group

Eutamias minimus pictus (Allen) --- GREAT BASIN CHIPMUNK.

Type locality. - "Kelton, Boxelder County, Utah." (37)

Distribution. - "Great Basin region of northwestern Utah, southern Idaho, Nevada, (except southeastern part), and eastern and central Oregon; north to central Washington and central Idaho (Lemhi); east to extreme southwestern Wyoming; south to Nephi, Utah, and Honey Lake, and Olancha Peak, Calif. Zonal range: Upper Sonoran; 2,000 feet (Yakima County, Wash.) to 10,500 (White Mountains, Calif.) altitude." (28)

Howell (28) states that with the reporting of a single specimen from Donovan, Montana, it is known that this species has pushed eastward from Idaho across the divide.

Description. - "Color: Summer pelage: Head smoke gray, more or less mixed with light pinkish cinnamon; median dorsal stripe blackish, margined with sayal brown; outer dark dorsal stripes snuff brown varied blackish; outer pair of light dorsal stripes white; inner pair grayish white, mixed with sayal brown; sides pinkish cinnamon, soon fading to light pinkish cinnamon; rump and thighs smoke gray; feet grayish white, washed with pale pinkish buff; tail above blackish brown, the hairs tipped with pale svellaneous, bordered with blackish and edged with pale pinkish buff (the median area often largely overlaid with blackish hairs); underparts creamy white. Winter pelage; . . . averaging slightly more grayish dorsally, and paler on under side of tail . . . upper parts more extensively grayish (less buffy), especially on head, nape, and shoulders." (28)

Measurements. - Average: Total length, 186.1; tail vertebrae, 85.6; hind foot, 29; ear from notch, 10.6. Weight: 35 grams. (28)

Eutamias minimus pallidus (Allen) --- PLAINS OR PALE CHIPMUNK.

Type locality. -"Camp Thorne, near present town of Glendive, Yellowstone River, Dawson County, Montana." (37)

Distribution. - "Plains region of eastern Montana, northern and eastern Wyoming, western North Dakota, western South Dakota, and extreme northwestern Nebraska; north to the Missouri River in Montana; east to the Missouri River in North Dakota; south to the valley of the North Platte in eastern Wyoming and to the Wind River Basin in eastern Wyoming; west to Meagher and Sweet Grass Counties, Mont., and to the foothills of the Wind River Mountains, Wyoming. Zonal range: Upper Sonoran and Lower Transition; 4,500 to 7,500 feet altitude." (28)

In the Shields Valley I have not been able to collect any specimens of this species, but Mr. Lester Gilbert, an employee of the U.S. Forest Service, tells me that he has seen specimens in the Crazy Mountains which form the eastern boundary of the valley. Howell (28) reports specimens as having been examined on Big Timber Creek (8-10 miles north of Big Timber), and at Ringling. In as much as the Crazy Mountains lie between these two localities these chipmunks are undoubtedly distributed thru the mountains.

Description. - "Summer pelage: (July and August) Head pale smoke gray, mixed with pinkish buff; median dorsal stripe blackish, bordered with sayal brown; other dark dorsal stripes sayal brown mixed with fuscous; median pair of light stripes pale smoke gray, tinged with pale buff; feet pinkish buff; tail above, fuscous black overlaid with pale pinkish buff; beneath, pinkish cinnamon or pinkish buff, bordered with fuscous black and edged with pale pinkish buff. Winter pelage (May 29(: Head, nape, shoulders, rump, thighs, and median pair of stripes light dorsal, dark smoke gray; two outer pairs of dark dorsal stripes mixed fuscous and sayal brown, the general tone near bister; sides pinkish buff; under side of tail between clay color and sayal brown; otherwise as in summer." (28)

Measurements. - Average of twelve adults from eastern Montana: Total length, 208.4; tail vertebrae, 96.7; hind foot, 33.1; ear from notch, 13. Weight: "One subadult male from Sanish, N. Dak., 38 grams." (28)

Eutamias minimus consobrinus (Allen) --- WASATCH CHIPMUNK.

Type locality. - "Wasatch foothills, 18 miles east of Salt Lake City, Utah." (37)

Distribution. - "Western Wyoming, extreme eastern Idaho, northern and south-central Utah, north-central Arizona, and northwestern Colorado; north to the Beartooth Mountain, southern Montana; east to the Wind River Mountains, Wyoming, and Grand

and Cunnison Counties, Colo., south to Sapinero, Colo., and Kaibab Plateau, Ariz.; west to the Wasatch and Beaver Mountains Utah. Zonal Range: Transition and Canadian; 6,200 feet (Meeker, Colo.) to 11,800 feet (LaSal Mountains, Utah.)" (28)

Howell (28) reports one specimen having been taken at Yellowstone, Gallatin Co., Montana.

Description. - "Summer pelage (July and August): Crown and occiput mixed smoke gray and ochraceous tawny, bordered on each side with a fuscous stripe, facial stripes fuscous or fuscous black, mixed with tawny, the ocular stripe darkest; postauricular patches rather small, grayish white; median dorsal stripe black, bordered with tawny; outer dark dorsal stripes mixed blackish and tawny; median pair of light stripes grayish white, often clouded with tawny; outer pair white; rump and thighs smoke gray, washed with cinnamon buff; light pinkish cinnamon or pinkish buff feet; sides ochraceous tawny or light sayal brown; underparts grayish white, faintly tinged with buff; tail above, fuscous black, overlaid with cinnamon buff. Winter pelage (September 27); General tone of upper parts and sides more grayish (less tawny) than the summer pelage; head, nape, median pair of light dorsal stripes, rump, and thighs about mouse gray, slightly mixed with tawny; dark dorsal stripes bister; sides sayal brown." (28)

Measurements. - Average of 15 adults from Wasatch and Uinta Mountains, Utah: Total length, 192.8; tail vertebrae, 87.2; hind foot, 29.9; ear from notch, 11.4 (28)

Eutamias minimus oreocetes (Merriam) --- TIMBERLINE CHIPMUNK.

Type locality. - "Summit Mountain, north of Summit station (on Great Northern Railroad), Flathead County, Montana." (37)

Distribution.- "Known at present only from near timberline

in Glacier National Park, Mont. Zonal Range: Hudsonian."
(28) Found near timberline along crest of the mountains in Glacier Park. Specimens were taken by Bailey (9) at Summit Station, Piegan Pass, and Gunsight Pass.

Deacription. - "Summer pelage (incomplete, July 25): Head smoke gray, cinnamon and bordered on each side with a snuff brown stripe; submolar stripe sayal brown; light facial stripes grayish white; ears pale smoke gray on posterior half, sayal brown on anterior base, without conspicuous blackish patches; post-auricular patches large grayish white; median dorsal stripe black, the others fuscous black, all more or less shaded with sayal brown; light dorsal stripes grayish white; sides sayal brown or clay color; feet grayish white, faintly washed with pinkish buff; tail above, fuscous black, overlaid with cinnamon buff; underparts creamy white. Worn winter pelage (June and July): Similar to the summer pelage but general tone decidedly more grayish (less tawny): median dorsal stripe black, the other dark dorsal stripes pale smoke gray; outer pair white; rump and thighs smoke gray; sides pinkish buff; front feet grayish white; hind feet soiled whitish, faintly tinged with ivory yellow; tail above, fuscous black, mixed with cinnamon and overlaid with pinkish buff; underparts creamy white. Young pelage (Piegan Pass, Mont., August 4): Similar to the worn winter pelage, but dorsal stripes (except median one) more brownish (mikado brown, mixed with fuscous, the

general tone near warm sepia); tail paler beneath (between cinnamon buff and pinkish buff)." (9)

Measurements. - Average of four adults from type region: Total length, 197.2; tail vertebrae, 88; hind foot, 31.8; ear from notch, 11.4 (28)

Eutamias minimus borealis (Allen) --- NORTHERN CHIPMUNK.

Type locality. - "Fort Laird, Mackenzie, Canada." (37)

Distribution. - "Interior Canada, from southern Mackenzie (Fort Simpson and Great Slave Lake) south over northeastern British Columbian, the greater part of Alberta, Saskatchewan, Manitoba, and Ontario to northern North Dakota (Turtle Mountains) and the eastern end of Lake Superior; also isolated colonies in eastern part of the northern peninsula of Michigan, in the Black Hills of South Dakota, Bear Lodge Mountains of Wyoming, and the Big Snowy, Bear Paw, and other ranges in central Montana; west to the foothills of the Rocky Mountains in Alberta and to Tatletuey Lake, northern British Columbia; east to the Mattagami River and Lake Nipissing, eastern Ontario. Zonal range: Canadian and Transition." (48)

Description.- Type (apparently in summer pelage): Crown and occupit mixed grayish white and cinnamon, the general tone drab; stripe from nose to eye fuscous black, the other facial stripes about snuff brown; light facial stripes soiled whitish; ears fuscous, the posterior portion soiled whitish; ears fuscous, the posterior portion soiled whitish; dark dorsal

stripes black, edged with tawny; light dorsal stripes creamy white, the median pair moderately sprinkled with tawny; sides sayal brown; rump and thighs buffy brown; front feet pinkish buff; hind feet cinnamon buff; tail above, fuscous black, overlaid with pinkish buff; underparts creamy white, tinged with pale buff. Winter pelage: Very similar to the summer pelage, but general tone of upper parts more grayish (less tawny and sides somewhat paler." (28)

Measurements. - Average of 11 adults from Stove River, northern Alberta and southern Mackenzie; Total length, 217.4; tail vertebrae, 101.7; hind foot, 31.3; ear from notch, 12.7; (28) Weight: "One adult from Walhalla, S. Dak., 52.6 grams." (28)

Eutamias amoenus Group

Eutamias amoenus luteiventris (Allen) --- BUFF-BELLIED CHIPMUNK.

Type locality. - "Chief Mountain Lake." (Waterton Lake), Alberta (3½ miles north of the United States - Canada boundary)." (37)

Distribution. - "Rocky Mountain region of southern Alberta, southeastern British Columbia, extreme northeastern and southeastern Washington, northern, central, and southeastern Idaho, western Montana, and northwestern Wyoming; north to Golden, British Columbia, and Banff, Alberta; east to the Highwood and Crazy Mountains, Mont., and the Shoshone Range, Wyo.;

south to the Salt River Mountains, Wyo.; west to Shuswap and Okanagan Lake, British Columbia, Thompson Falls, Mont., and thru central Idaho to the Blue Mountains in northeastern Oregon and southeastern Washington. Zonal range: Transition and Canadian; 3,000 feet (Cranbrook, British Columbia) to 10,000 feet (Teton Mountains, Wyo.)" (28)

Description. - "Summer pelage (August): Top of head cinnamon mixed with smoke gray; dark facial stripes fuscous or fuscous black, the lower one broad and mixed with ochraceous tawny; light facial stripes whitish, usually tinged with cinnamon buff or light ochraceous buff; ears fuscous or fuscous black, broadly margined postauricular patches light buff or buffy white; sides of neck below ears strongly washed with ochraceous buff; dark dorsal stripes blackish, the outer ones quite often brownish from a mixture of tawny hairs; light dorsal stripes white, the median pair tinged with pale smoke gray, the outer pair often creamywhite; rump and thighs dark smoke gray strongly mixed with cinnamon buff; sides tawny or ochraceous tawny; feet pinkish cinnamon or cinnamon buff; tail above, fuscous black overlaid with clay color; tail beneath, light ochraceous tawny, margined with fuscous black and edged with clay color; underparts cinnamon buff or light ochraceous buff. Winter pelage: (Yellowstone Park., Wyo., October 29): Similar to summer pelage but upper parts more grayish, especially on the shoulders and rump; median pair of light stripes darker (less clear white); sides

considerably paler - about clay color." (28)

Measurements.-pAverage of 10 adults from type locality: Total length, 221.5; tail vertebrae, 101.8; hind foot, 33.2; ear from notch, 13.5. (28)

Eutamias amoenus vallicola (Howell) --- BITTERROOT VALLEY CHIPMUNK.

Type locality. - "Bass Creek, near Stevensville, Ravalli County, Montana. Altitude, 3,725 feet." (37)

Distribution. - "Known only from the Bitterroot Valley, Montana, and the foothills on either side. Zonal range: Transition; 3,000 to 4,500 feet altitude." (28)

Description. - "Unworn winter pelage (type, March): Top of head, nape, shoulders, and median pair of dorsal stripes pale smoke gray, mixed with cinnamon; ears fuscous, margined posteriorly with smoke gray; postauricular patches creamy white; dark dorsal stripes blackish, margined with pinkish cinnamon, the outer pair and the lateral stripes slightly paler, and sprinkled with pinkish cinnamon; outer pair of light stripes clear white; sides between pinkish cinnamon and pinkish buff (clear pinkish buff in some specimens); rump and thighs mixed pinkish cinnamon and smoke gray; hind feet light pinkish cinnamon; front feet a paler shade of the same; tail above, fuscous black, overlaid with pinkish buff; tail beneath, cinnamon buff or pinkish buff, margined with fuscous black and tipped with pinkish buff; underparts

pale pinkish buff. Summer pelage (August): Similar to winter pelage, but sides darker." (28)

Measurements. - "Average of 11 adults from Bitterroot Valley, Mont. Total length, 215.4; tail vertebrae, 95.4; hind foot, 32; ear from notch, 14. " (28)

Eutamias amoenus canicaudus (Merriam) --- GRAY-TAILED CHIPMUNK.

Type locality. - "Spokane, Spokane County, Wash." (37)

Distribution. - "Eastern Washington, northern Idaho, and a small area in northwestern Montana; east to Clark Fork of the Columbia (opposite Thompson Falls, Mont.); west to the Columbia River; north to Marcus, Wash.; south to Orofino, Idaho, and the foothills of the Blue Mountains southeastern Washington. Zonal range: Transition: 1,100 to 3,000 feet altitude." (28)

Description. - "Summer pelage (August): Top of head cinnamon mixed with smoke gray; dark dorsal stripes black, contrasting strongly with the light stripes; median pair of light stripes whitish heavily mixed with ochraceous tawny or cinnamon; outer pair creamy white; rump and thighs cinnamon buff; mixed with smoke gray; feet light pinkish cinnamon; sides sayal brown; tail above, blackish, overlaid with pale smoke gray or pinkish buff; tail beneath pinkish buff, bordered with blackish and edged with pinkish buff or pale buff. Winter pelage: Similar to the summer pelage, but tail usually more grayish, edged with pale pinkish buff or smoke gray; sides paler, approaching pinkish buff. In the worn winter pelage (April and May) the ochraceous tones of the upper parts and sides are much faded, giving to the animal a distinctly drabby tone." (28)

Measurements. - Average of 13 adults from type region: Total length, 227.2; tail vertebrae, 104.4; hind foot, 33.7 ear from notch, 14. (38)

Eutamias Quadrivattatus Group

Eutamias umbrinus (Allen) --- UINTA CHIPMUNK.

Type locality. - "Black Fork, Uinta Mountains, Utah. Altitude 9,000 feet." (37)

Distribution. - "Uinta and Wasatch Mountains in northeastern Utah and southwestern Wyoming; also mountains of western Wyoming (Salt River, Teton, Wind River, Absoraka and other ranges) and eastern Idaho (Big Hole Mountains); north to the Bear Tooth Mountains, Mont., southern limits not definitely known. Zonal range: Canadian; 7,000 to 11,000 feet altitude." (28)

Description.- "Summer pelage (July - September): Head pale smoke gray, shaded with fuscous and cinnamon and bordered on each side with a stripe of fuscous or bister; ocular stripe fuscous black; submolar stripe snuff brown or bister (often rather indistinct); ears fuscous or fuscous black, broadly margined posteriorly with grayish white; post-auricular patches grayish white, rather faintly indicated; median dorsal stripe black, edged with sayal brown; outer pair fuscous black, much mixed with sayal brown; light dorsal stripes white, the median pair slightly narrower and often clouded with sayal brown; lateral stripes nearly or quite obsolete; sides sayal brown, shaded with clay color or cinnamon; rump and thighs sayal brown, shaded with smoke gray; feet cinnamon buff or pinkish buff; tail above, fuscous black mixed with tawny or buff; tail beneath, tawny, ochraceous tawny, or sayal brown bordered with fuscous black and edged with pinkish buff or cinnamon buff; underparts creamy white, Winter pelage: Not appreciably different from the summer pelage." (28)

Measurements. - Average of 14 adults from Uitna and Wasatch Mountains, Utah: Total length, 225.9; tail vertebrae, 101.1; hind foot, 323; ear from notch, 14.4. (28)

Eutamias ruficaudus ruficaudus (Howell) --- RUFOUS-TAILED CHIMPUNK.

Type locality.- "Upper St. Mary Lake, Glacier County, Mont." (37)

Distribution.- "Eastern slopes of the Rocky Mountain divide in western Montana, from the Canadian boundary south to Deer Lodge County," (28) The limits of the range of this species is imperfectly known. V. Bailey (9) found them on the south side of St. Mary Lake, Glacier County, Montana." (37) "Eastern slopes of the Rocky Mountain divide in western Montana, from the Canadian boundary south to Deer Lodge County." (28) The limits of the range of this species is imperfectly known. V. Bailey found them on the south side of St. Mary Lake, at Summit, and Paloa in Glacier National Park. In his description of these animals he calls them Eutamias umbrinus felix Rhoads, but Howell (28) considers them as properly being Eutamias ruficaudus ruficaudus.

Description. -"Winter pelage (May and June): Sides of nose pinkish cinnamon or cinnamon buff; top of head mixed cinnamon and fuscous, sprinkled with grayish white and bordered with an indistinct fuscous stripe; light facial stripes grayish white, shaded with buff; submalar stripe fuscous or mixed with tawny; ocular stripe fuscous black; ears fuscous black, the posterior margin side with a broad band of buffy white or pinkish buff; inside of ears clothed with cinnamon hairs; postauricular patches buffy white, rather small and inconspicuous; dark dorsal stripes black or fuscous black; median pair of light stripes grayish white, mixed with cinnamon or tawny and shading anteriorly into the color of the crown; outer pair of light stripes creamy white; lateral stripes fuscous black, overlaid with tawny - often very indistinct; rump and thighs mouse gray, mixed with orange cinnamon; tail beneath, amber brown, bordered with fuscous black and edged with light pinkish cinnamon; underparts creamy white, faintly washed with pale pinkish buff." (28)

Measurements. - Average of 12 adults from the type locality; Total length, 231.2; tail vertebrae, 106.2; hind foot, 35;

ear from notch, 14.4. (28)

Eutamias ruficaudus simulans (Howell) --- COUER D'ALENE CHIPMUNK.

Type locality. - "Couer d'Alene, Kootenai County, Idaho." (37)

Distribution. - "Mountains of northwestern Montana (west of the main divide), northern Idaho, northeastern Washington, and southeastern British Columbia. Zonal range: Transition and Canadian; 2,400 to 6,300 feet altitude." (28)

Description. - "Summer pelage (August): Top of head cinnamon or ochraceous tawny, mixed with fuscous and white, bordered on each side with a fuscous stripe; ocular stripe fuscous black, shaded posteriorly with ochraceous tawny; submalar stripe fuscous, washed with cinnamon or clay color; ears chestnut drab, broadly margined posteriorly with pinkish buff; sides of nose and face washed with clay color; dark dorsal stripes black or fuscous black; median pair of light stripes grayish white, more or less mixed with ochraceous tawny; outer pair creamy white; lateral stripes fuscous or fuscous black; shoulders and sides ochraceous tawny (sometimes nearly tawny); rump and thighs mixed clay color and fuscous; hind feet pinkish cinnamon; front feet light pinkish cinnamon; tail above, fuscous black, overlaid with pinkish buff; tail beneath, ochraceous tawny, bordered with fuscous black and tipped with pinkish buff; underparts grayish white, washed with pale pinkish buff. Winter pelage (April): Similar to the summer pelage but upper parts paler and more grayish (much less tawny): sides cinnamon or pale ochraceous tawny; tail edged with tilleul buff or pale smoke gray." (28)

Measurements. - Average of 10 adults from northern Idaho and northeastern Washington: Total length, 238.2; tail vertebrae, 112.5; hind foot, 33.6; ear from notch, 13.9 (28)

Genus Sciurus

Subgenus Tamiasciurus

Hudsonicus Group

Sciurus hudsonicus dakotensis (Allen) --- BLACK HILLS RED SQUIRREL.

Type locality. - "Squaw Creek, Black Hills, Custer County, South Dakota." (37)

Distribution. - "Found in 'The Black Hills, of South Dakota and adjoining portion of Wyoming.'" (2)

"This light colored race of the red or pine squirrel, which occurs in its typical form in the Black Hills region of South Dakota, is of fairly common occurrence, according to notes in the Biological Survey, in the yellow pine forests of the Sioux National Forest near Ekalaka and east of Sykes; as well as in the Custer National Forest; and in the region of Lame Deer, in the Tongue River Indian Reservation. Specimens from these places appear to be typical dakotensis." (43)

Description. - Upperparts light yellowish rufous in winter and a pale yellowish olivaceous gray in summer. Underparthairs slatey at the base, washed with white and tipped with gray. (2)

Measurements. - "Total length, 14 inches; tail vertebrae, 5.8 inches; hind foot, 2 inches." (2)

Sciurus hudsonicus baileyi (Allen) --- BAILEY RED SQUIRREL.

Type locality. - "Big Horn Mountains, Washakie County, Wyoming. Altitude 8,400 feet." (37)

Distribution. - "Outlying mountain ranges of central Wyoming and eastern Montana, and northward into Alberta in the eastern foothills of the Rocky Mountains. Its range includes the Bighorn, Pryor and Laramie Mountains in Wyoming, and the Big Snowy, Bear Paw, and Little Rocky Mountains of Montana, and probably other outlying, pine covered buttes and hills." (23)

Description. - "Winter pelage. - Dorsal surface a pale yellowish gray, with a broad median reddish band. Summer pelage; yellowish olivaceous above, feet ochraceous orange to reddish orange; a distinct black lateral line separating the dorsal surface from the ventral which is white, usually washed with fulvous; upper surface of the tail a grizzled red and black." (23)

Measurements. - "Total length, 13.6 inches; tail vertebrae, 5.6 inches; hind foot, 2 inches." (2)

Sciurus hudsonicus richardsoni (Bachman) --- RICHARDSON RED SQUIRREL.

Type locality. - "Head of Big Lost River, Fremont County, Idaho." (37)

Distribution.- "The Bitterroot and Couer d'Alene Mountains

on the western border of Montana; the Lost River; Salmon River, Pahsimerei and Saw Tooth Mountains in central Idaho, and westward in the Craig and Seven Devils Mountains to the Powder River and Blue Mountains of Oregon; thence thru northern Idaho, and west in the mountains or northeastern Washington to Colville, and northward into the Kootenai District of eastern British Columbia." (2)

Description. - "Winter pelage: A broad median dorsal band of chestnut rufous; rest of upper surface a dark gray with a fulvous wash; tail with a narrow central area of dark rufous, extending about half the length of the tail; the rest of the tail an intense black; black lateral line generally prominent; underparts grayish white, vermiculated with black; the apical halves of the tufted ears black. Summer pelage: Uniform rufous olivaceous above; feet, forearms, shoulders and lateral surface of hind limbs ochraceous to reddish orange; black lateral line strongly developed; ventral surface pure white; tail with a narrow deep reddish central area above, over one-half to two thirds of its length; rest of the upper surface of the tail black." (23)

Measurements. "Total length, 13.5 inches; tail vertebrae 5.4 inches; hind foot, 2 inches." (2)

Sciurus hudsonicus ventorum (Allen) --- WIND RIVER MOUNTAINS RED SQUIRREL.

Type locality. "South Pass City, Wind River Mountains, Fremont County, Wyoming." (37)

Distribution. - "Wind River Mountains region and northward along the eastern base of the Rocky Mountains to at least Mystic Lake, and probably to the Belt Ranges east of Helena, and thence westward to the head of the Snake River in Idaho, and south along the Idaho and Wyoming boundary to the Wasatch Mountains in northeastern Utah. Its range thus includes not only the Wind River and Gros Ventre Ranges, but the Shoshone and Beartooth Mountains, the whole of the Yellowstone National Park region and the outlying ranges east of the main divide to central Montana; to the westward and southward it includes the Snake River, Cariboo, Thompson Blackfoot, Bear River, Bannock, and Wasatch Ranges, with their outlying and included or connected spurs." (23)

Description.- A specimen which I examined in September 1933 was dark olivaceous mixed with black on the upper parts with a median rusty reddish band about three quarters of an inch wide extending from the neck to the end of the tail. The underparts were white with a dark under fur. The shoulders fore arms and thighs were of a bright rusty red color. The tail was bordered with a broad band of black. The lateral line was indistinct. The most striking feature of the coloration being a white margin which surrounded each eye. The ears were not tufted.

Measurements. - "Total length, 13.2 inches; tail vertebrae, 5.4 inches; hind foot, 2 inches." (2)

Subfamily Pteromyinae

Genus Glaucomys

Sabrinus Group

Glaucomys sabrinus bangsi (Rhodes) --- BANGS FLYING SQUIRREL.

Type locality. - Idaho County, Idaho. (37)

Distribution.- "Mountains of central Idaho, eastern Oregon, southwestern Montana, and western Wyoming, north to the vicinity of Flathead Lake." (29)

According to Bailey (9) this species probably is to be found in the higher levels and on the eastern slope of Glacier National Park.

Description. "Winter pelage: Upperparts pale wood brown or avellaneous, shading in some specimens to vinaceous-cinnamon; feet pale hair-brown, underparts whitish, strongly washed with pinkish cinnamon or avellaneous.

Variation (May specimen from Lake Como, Montana): Upperparts pale orange-cinnamon; feet pale fuscous." (29)

Measurements. - Average of 9 adults from Idaho and Montana: Total length, 315; tail vertebrae, 142; hind foot, 39.5. (29)

Glaucomys sabrinus latipes (Howell) --- BROAD-FOOTED FLYING SQUIRREL.

Type locality. - "Glacier, British Columbia, Canada." (37)

Distribution.- "Selkirk Range, and other ranges in southeastern British Columbia, higher mountains of northern Idaho

and northwestern Montana; south to Mullen and Orofino, Idaho." (29)

Description. - "Winter pelage: Upperparts drab, more or less mixed with sayal brown; sides of face smoke gray; ears fuscous; upper surface of flying membrane dark clove brown; hind feet fuscous; fore feet dark hair-brown, the toes shaded with buffy white; tail above, fuscous shaded with sayal brown; beneath, pinkish buff or light ochraceous-buff, more or less mixed with fuscous; underparts chiefly sayal brown with a drab tinge, otherwise as in winter." (29)

Measurements.- Average of 10 adults from Glacier, British Columbia; Coolin, Idaho; and Stanton Lake and Nyack, Mont.; Total length, 342; tail vertebrae, 153; hind foot, 41.4 (29)

Family Geomyidae

"Fossorial rodents with large, strong claws on forefeet; small eyes and ears; external, fur-lined cheek-pouches; broad head; thickset body; legs short and stout; scantily haired tail, tip supplied with tactile nerves." (2)

Subfamily Geomyinae

Genus Thomomys

Thomomys talpoides talpoides (Richardson) --- SASKATCHEWAN POCKET GOPHER.

Type locality. - "Near Fort Carlton, Saskatchewan, Canada (37)

Distribution. - "Plains of Saskatchewan and Alberta, south in Montana to Great Falls and the Big Snowy Mountains." (6)

Bailey (9) reports these animals as occurring in the Swift Current Valley and along the Belly River in Glacier National Park.

Description.- "'Size medium; ears prominent and pointed; claws slender; color dull and dark gray.' (6) Upperparts (summer) dull grayish brown; darker, almost black, on nose and about ear; feet whitish; tail whitish, often only white tipped; underparts varying from buffy to dirty whitish gray; pure white on chin and sometimes on throat and breast. Winter pelage much like summer." (2)

Measurements. - "Total length, males and females, 8.5 inches; tail vertebrae, 2.4 inches; hind foot, 1.15 inches." (2)

Thomomys talpoides pryori (Bailey) --- PRYOR MOUNTAIN POCKET GOPHER.

Type locality. - "Head of Sage Creek, Pryor Mountains, Carbon County, Montana. Altitude 6,000 feet. (37)

Distribution. "Pryor Mountains, Montana, east to the Big Horn River near Fort Custer." (6)

Description. "Upperparts (summer) dull walnut brown; nose slate colored; black about ears; dark gray on cheeks; dirty whitish to buffy on feet and tail. Underparts dark buff,

lacking white on chin, throat and breast. Winter pelage grayer." (2)

Measurements. - "Total length, males, 8.2 inches, females 8.0; tail vertebrae, males, 2.4 inches, females, 1.1 inches; hind foot, males, 1.16 inches, females, 1.14 inches." (2)

Thomomys talpoides bullatus (Bailey) --- SAGEBRUSH POCKET GOPHER.

Type locality. - "Powderville, Custer County, Montana." (37)

Distribution. - "Plains of eastern Montana, northeastern Wyoming, and western South Dakota; north to Medicine hat, Alberta." (6)

Description.- "Upperparts (summer) light buffy varying to hazel, washed with gray; crown brighter than sides; cheeks grayish; blackish about ears; underparts buffy. Winter pelage paler above than in summer, light buffy gray, underparts creamy white." (2)

Measurements. - "Total length, males, 9.5 inches, females, 9.0 inches; tail vertebrae, males, 3.0 inches, females, 3.1 inches; hind foot, males 1.2 inches, females, 1.16 inches." (2)

Thomomys fuscus fuscus (Merriam) ---BROWN POCKET GOPHER.

Type locality. - "Mountains at head of Big Lost River, Custer County, Idaho." (37)

Distribution. - "Southeastern British Columbia, greater part of northern and central Idaho and western Montana, northwestern Wyoming, and parts of eastern Washington and Oregon." (6)

Bailey (9) also reports that these animals are found in Glacier National Park in the following localities: Big Prairie in the north fork of the Flathead Valley, in the garden back of Glacier Park Hotel, at Summit Station, and near the lower end of St. Mary Lake. Near timberline south of Red Eagle Lake, and on the pass between Chief Mountain and Gable Mountain.

Description. - "Small in size; ears slender, pointed; feet slender; color light brown. Upperparts (summer) light brownish; slatey on nose, blackish about ear, dirty whitish on feet and tail; underparts buff. Winter pelage duller in tone than summer. " (2)

Measurements.- "Total length, males and females, 8.1 inches; tail vertebrae, 2.2 inches; hind foot, 1.08 inches." (2)

Thomomys fuscus naturatus (Bailey) --- COEUR D'ALENE POCKET GOPHER.

Type locality. - "Silver, near Saltese, Couer D'Alene Mountains, Missoula County, Montana." (37)

Description. - "Larger and darker than typical fuscus. Upper-

parts (summer) dark rich hazel; yellowish on sides, slatey on nose, black about ear, buffy gray on feet and tail; underparts washed with buffy, occasionally a small patch of white on chin or throat. Winter pelage unknown." (2)

Measurements. - "Total length, males, 9 inches, females, 8.6 inches; tail vertebrae, males, 3.1 inches, females, 2.9 inches; hind foot, males, 1.2 inches, females, 1.16 inches." (2)

Family Heteromyidae

"Small rodents with external, fur-lined cheek-pockets; forefeet not equipped with greatly developed claws; hind legs more or less elongated; tail generally as longas head and body, often much longer; skull with elongated rostrum and inflated temporal region." (2)

Genus Perognathus

Subgenus Perognathus

Fasciatus Group

Perognathus fasciatus fasciatus (Wied) --- MAXIMILLIAN POCKET MOUSE.

Type locality. - "Upper Missouri River near its junction with the Yellowstone, northwestern North Dakota." (37)

Distribution. - "Upper Sonoran and Transition zones of eastern Montana and Wyoming, eastward into the adjoining

parts of North and South Dakota." (41)

Description. - "A rather small mouse with external fur-lined cheek-pockets; tail fairly long; hind legs long; ears small but not hidden in fur; nocturnal in habit . . . . Upperparts olive gray finely mixed with black; sides like back; a buff lateral line from nose to end of tail; buffy about eye and ears; tail dusky above, buffy on sides, white below; pelage everywhere slate-colored at base; underparts clear white." (2)

Measurements. - Sexes approximately equal size, males slightly larger than females. Total length, 5.5 inches; tail vertebrae, 2.5 inches; hind foot, .68 inches." (2)

Genus Dipodomys

Dipodomys ordii luteolus (Goldman) --- WYOMING KANGAROO RAT.

Type locality. - "Caspar, Natrona County, Wyoming." (37)

Distribution. - "Wyoming, southeastern Montana, and the upper part of the Green River Valley in northwestern Colorado." (2)

Description. - "Size large (for the group); color pallid; tail long. Upperparts light buff to light ochraceous buff. Underparts clear white." (2)

Measurements. - "Total length, 10.5 inches; tail vertebrae, 6 inches; hind foot, 1.65 inches." (2)

Dipodomys ordii richardsoni (Allen) or Perodipus montanus richardsoni (Allen) (4) --- RICHARDSON KANGAROO RAT.

Type locality. - "Beaver River, Beaver County, Okla." (4)
Distribution. -"Common in eastern Montana and western South Dakota." (4)
Description. - "Big head and short body, long brush-tipped tail, long hind legs and feet, small hands, and ample fur-lined cheek pouches combine to produce a most unique and striking appearance. Upperparts, bright buffy-yellow with a white band crossing each flank and white spot over each eye; underparts and stripe along each side of tail, white." (4)
Measurements. "Total length, 264; tail vertebrae, 145; hind foot, 40." (4)

Family Castoridae

"Resembling the Sciuridae but cheek-teeth not rooted, crown pattern with re-entrant enamel folds instead of tubercles; mandible heavy; size large; form thickset; tail broad, flat and scaly; habit aquatic." (2)

Genus Castor

Castor canadensis canadensis (Kuhl) --- CANADIAN BEAVER

Type locality. - "Hudson Bay". (4)
Distribution. - "In northern North America from nearly 70

degrees north in Yukon and 58 degrees in Labrador, south to about 35 degrees in eastern and central states, and 45 degrees in the Rocky Mountain section." (2)

Description. - "Heavy-bodied, strong, powerful animals, with large, webbed hind feet; broad, flattened, naked, scaly tails; dense fine underfur, and long coarse outer hair of a dark chestnut-brown color; and short ears and huge chisel-like incisor teeth well adapted for cutting wood. In fresh fall fur they are dark, rich chestnut-brown in color, which fades to a somewhat lighter brown before the spring molt." (4)

Measurements. Total length, 1150; tail vertebrae, 400; hind foot, 195. (4)

Castor canadensis frondator (Mearns) --- BROAD-TAILED BEAVER- SONORA BEAVER.

Type locality. - "San Pedro River, Sonora, Mexico, near monument #98 of the Mexican boundary line." (37)

Distribution.- "In northwestern states from Mexico to Montana but never found west of the 115th meridian." (2)

Description. - Large, pale in color, broad tail; upperparts russet, sides wood-brown; feet burnt sienna. Underparts paler. (2)

Measurements. - "Total length, 45 inches; tail vertebrae, 15 inches; scaly portion of tail, 11.4 by 6.2 inches; weight, 62 pounds." (2)

Castor canadensis missouriensis (Bailey) --- MISSOURI RIVER BEAVER.

Type locality. - "Apple Creek, 7 miles east of Bismarck, Burleigh County, North Dakota." (37)

Distribution. The Missouri River drainage from Nebraska to Montana. (4)

Description. - "Colors, back, bright hazel brown; sides duller brown; underparts smoky gray." (4)

Measurements. - "Total length, 900; tail vertebrae, 270; hind foot, 170. Weight estimated at 35 to 40 pounds." (4)

Family Cricetidae

"Form typically rat or mouse-like; molar teeth never more than three on a side; molar crown pattern composed of tubercles arranged in two primary longitudinal rows, or made up of angular figures." (2)

Leucogaster Group

Onchomys leucogaster missouriensis (Audubon and Bachman) --- AUDUBON GRASSHOPPER MOUSE.

Type locality. - "Fort Union, near present town of Buford, Williams County, North Dakota." (37)

Distribution. - "Southeastern Alberta, southwestern Saskatchewan, northern and eastern Montana, western North Dakota, and northeastern Wyoming. North to Calgary, Alberta, and Carlton, Saskatchewan; east to Glenullin, North Dakota; south up the Missouri River to Bozeman, Montana, and up the branches of the Powder and Little Missouri Rivers into northeastern Wyoming. Chiefly arid Transition." (24)

Description. - "Adult in full winter pelage (Dickinson, N.D., Feb. 14): Upperparts dark wood-brown, the head and middle parts of body heavily darkened by the color of the darker brown hair tips; underfur dark neutral gray; langinous ear tufts pure white and very conspicuous, as are also the black and white markings on the outer side of the ear. Lips, lower cheeks, arms, hands, lower legs, feet, lower sides, and entire underparts pure white, very sharply marked from color of upperparts. Adults in early summer (Buford, N.D., May 8): Like winter pelage but less bright in color, the rich wood-browns faded and worn drab and buff; the head and back dark grayish brown; and the white of the underparts mixed with gray of the underfur. Juvenile (Medicine Hat, Alberta, Oct. 13): Very much lighter and grayer, less blackish, than the young of Leucogaster. Upperparts mouse gray, streaked with darker hair tips; white ear tufts and black and white markings on the ears conspicuous. Post juvenile pelage (Buford, N.D., May 5): Like the juvenile but browner, less ashy mouse-gray; the back and sides uniformly colored, without distinctly darker dorsum". (24)

Measurements. - "Total length, 150; tail vertebrae, 39; hind foot, 20.8; ear from notch in dry skin, 14.2" (24)

Genus Reithrodontomys

Subgenus Reithrodontomys

Megalotis Group

Reithrodontomys megalotis dychei (Allen) --- PRAIRIE HARVEST MOUSE.

Type locality. - "Lawrence, Douglas County, Kansas." (37)
Distribution. - "Greater part of Kansas, Nebraska, Iowa, Missouri, and South Dakota; southern North Dakota; southeastern Montana; eastern Colorado and eastern Wyoming." (27)
Description. - "Ochraceous above heavily washed with black, brown above, white below; underparts white. (27)
Measurements. - "Total elngth, 5.2 - 5.6 inches; tail vertebrae, 2.3 - 2.6 inches; hind foot, .6- .7 inches; ear from notch, .45 inches." (2)

Genus Peromyscus

Subgenus Peromyscus

Maniculatus Group

Peromyscus maniculatus artemisiae (Rhoads) --- SAGEBRUSH WHITE-FOOTED MOUSE.

Type locality. - "Ashcroft, British Columbia, Canada." (37)
Distribution. - "South central British Columbia, northeastern Washington, northern Idaho, western Montana, and western Wyoming. Transition and Canadian zones." (42)
Description. - "Ground color of upperparts varying from pale cinnamon to brownish fawn; dusky mixture usually somewhat concentrated on dorsum into an irregular darker area; ears dusky, whitish edged; subauricular tufts, when conspicuous, chiefly buffy cinnamon, lightly mixed into dusky; white much

reduced or absent; a dusky spot at base of whiskers; eyelids and sometimes a very narrow orbital ring dusky; feet white; forelegs white or often with a light mixture of dusky to wrists; 'ankles' dusky; underparts creamy white; tail dark brownish above, white below. Worn pelage: General color rather dull; sides pale fawn to russet; dorsum russet to Prout brown. Adolescent pelage: Ground color pale drabby fawn heavily mixed with dusky, slightly increased on dorsum; general effect of upperparts broccoli brown to hair brown. Young in first coat: Base of hairs slate color to blackish slate; general effect of upperparts mouse gray, decidedly darker and more slatey on dorsum." (42)

Measurements. - "Total length, 6.2 - 7.6 inches; tail vertebrae, 2.6 -3.4 inches; hind foot, .76 - .88 inch." (2)

Peromyscus maniculatus osgoodi (Mearns) --- OSGOOD WHITE-FOOTED MOUSE: BLACK-EARED DEER MOUSE.

Type locality. - "Calf Creek, Custer County, Montana." (37)

Distribution. - "Plain and foothills along the eastern base of the Rocky Mountains from south central Saskatchewan to the Pan-handle of Texas, occuyping in general the eastern parts of Montana, Wyoming, and Colorado, and the western and southwestern parts of Saskatchewan and the Dakotas. Upper Sonoran and Transition zones." (42)

Description. - "Upperparts from cream buff to pale ochraceous buff, with light sprinkling of dusky; dorsal region not much darker than sides; conspicuous white tufts at anterior bases of ears, clear buffy spots at posterior bases; 'ankles' buffy, sometimes touched with dusky; tail sharply bi-colored blackish brown and clear white; underparts clear creamy white." (2)

Measurements. - "Total length, 5.9 - 6.8 inches; tail vertebrae, 2.4 - 2.8 inches; hind foot, .8- .84 inch." (2)

Peromyscus maniculatus nebrascensis (Coues) --- NEBRASKA DEER MOUSE.

Type locality. - "Deer Creek, western Nebraska." (37)

Distribution. - "Found from Alberta southwards thru Montana, western North Dakota, and South Dakota; Wyoming, Colorado, western Oklahoma; and northwestern Texas." (52)

"Sandhill region of western Nebraska and adjoining parts of the states of Kansas, Colorado, South Dakota, and Wyoming. Possibly extending north to western North Dakota and south to western Oklahoma." (37)

Description. - "Upperparts ochraceous buff, sometimes much brighter and near orange buff, with light sprinklings of dusky; no well- defined dorsal stripe; occasionally a bright ochraceous buff lateral line present; rest of pelage about as in osgoodi." (2)

Measurements. - "Total length, 5.7 - 6.3 inches; tail vertebrae, 2.2 - 2.6 inches; hind foot, .76 - .82 inch." (2)

Leucopus Group

Peromyscus leucopus aridulus (Osgood) --- BADLANDS WHITE-FOOTED MOUSE.

Type locality. - "Fort Custer, Yellowstone County, Montana." (37)

Distribution. - "Upper Sonoran Zone of eastern Montana and Wyoming and the adjoining western parts of South Dakota and Nebraska; probably south to Oklahoma and west to eastern Colorado." (42)

Description. - "Upperparts ochraceous buff, lightly sprinkled with dusky; dorsal area very little darker than sides; underparts creamy white." (2)

Measurements. - "Total length 6.4 - 8.2 inches; tail vertebrae, 2.5 - 3.7 inches; hind foot, .84 to .92 inch." (2)

Genus Neotoma

Subgenus Teonoma

Neotoma cinerea cinerea (Ord) --- GRAY BUSHY-TAILED WOOD RAT.

Type locality. - "Near Great Falls, Cascade County, Montana." (37)

Distribution. - "Rocky Mountains region in southern British Columbia, Montana, Idaho, western Wyoming, Utah, northern Arizona, and thence westward thru the mountains of central Nevada to the southern part of the Sierra Nevada in California. Canadian Zone and down along cold cliffs and canyons well into the Transition zone." (21)

Description. - "Size large; hind feet large and heavily furred from heel to posterior plantar tubercle; ears large pelage long and thick. Upperparts grayish buff to ochraceous buff, thickly sprinkled with dusky hairs on back; fore and hind feet white; ears edged faintly with whitish clothed with brownish and grayish hairs; tail noticeably bushy but flattened, above brownish gray below white, banded with pale buffy at base; underparts white." (2)

Measurements. - "Total length, 15.5 inches; tail vertebrae, 6.5 inches; hind foot, 1.7 inches." (2)

Neotoma cinerea orolestes (Merriam) --- COLORADO BUSHY-TAILED RAT.

Type locality. - "Saguache Valley, 20 miles west of Saguache, Saguache County, Colorado." (37)

Distribution. "Rocky Mountain region from northern New Mexico thru Colorado and Wyoming to southern Montana and thence eastward to the Black Hills in South Dakota. Mainly

transition and Canadian zones." (21)

Description. - "Upperparts ochraceous buff, sprinkled with blackish on back; sides brighter than back; feet white; tail above grayish buff for one-third of length, brownish buff for the last two-thirds, below white banded at base with pale buffy; underparts white, pelage white to base on breast and inguinal region." (2)

Measurements. "Total length, 16 inches; tail vertebrae, 7 inches; hind foot, 1.6 inches." (2)

Subfamily Microtinae

Genus Phenacomys

Phenacomys intermedius intermedius (Merriam) --- ROCKY MOUNTAIN PHENACOMYS.

Type locality. "Basaltic plateau about 20 miles north northwest of Kamploope, British Columbia, Canada. Altitude 5,500 feet." (37)

Distribution. "British Columbia west of the eastern divide of the Rocky Mountains, northeastern Washington, Idaho, eastern and southern Oregon, and northern California; thence into the mountains thru southern Montana, Wyoming, and Colorado, and into northern New Mexico. Canadian and Hudsonian Zones, mostly in open, grassy parks." (31)

Description. - "The range of coloration, even in the same

locality, is often great, and varies from tawny olive to Saccardo umber of Ridgway, with various blendings of the two. The plumbeous bases of the hairs show thru to a greater extent in the case of the darker individuals. The underparts are whitish, occasionally with a tinge of buffy. Nose not pronouncedly tinged with yellow. This is the only species of the genus of which thoroly satisfactory specimens in undoubted winter pelage are available. This, in a December specimen from Colorado and the two October skins from Idaho, is much grayer (between drab and hair brown of Rdigway) and with little of the brownish cast to be found in summer skins. During cold weather the feet are white, because of the longer hairs, and the tail is then uniformly whitish, instead of bicolor. Young animals are usually darker than adults from the same place, and are more plumbeous, both above and below." (31)

Measurements. - "Male from Hazelton, British Columbia; Total length, 141; tail 27; hind foot, 18.5. Females from Nelson, British Columbia; 142; 37; 18. Skin from Okanagan, British Columbia; 142; 37; 17. Five males, Beartooth Mountains, Mont. 145 (142-147); 30 (26-34); 17-18. Two females, Beartooth Mountains, Mont.: 152; 34; 18." (31)

Phenacomys intermedius levis (A.B. Howell) --- ALBERTA PHENACOMYS.

Type locality. - "St. Mary's Lake, Teton County, Montana." (37)

Distribution. "Upon the eastern slope of the Rocky Mountains at least from central Alberta south to Teton County, Montana. Canadian and Hudsonian zones in rather open grassy or mossy situations." (31)

Description. - "Topotypes of this form have the basal tone close to the drab of Ridgway, with the tips of the dorsal hairs brown, the exact shade differing apparently with age--duller and darker in the case of old animals, and brighter and lighter in the younger ones (large immatures). The underparts are grayish, occasionally with a faint tinge of buffy. The feet are pure white, except when darkened by grease, and the tail distinctly bicolor. Young animals are darker and more plumbeous." (31)

Measurements. "Of two males: Total length, 135; tail, 34; hind foot, 17. Of six females: 139 (132-146); 33 (30-36); 18 (17-18)." (31)

Genus Evotomys

Evotomys gapperi gapperi (Vigors) --- GAPPER RED-BACKED MOUSE.

Type locality. - "Between York and Lake Simcoe, Ontario, Canada." (37)

Distribution. - "From Massachusetts, New Jersey, and Pennsylvania, northward and from the Atlantic coast westward to the

Rocky Mountains in Canada." (2) Common thruout the timbered areas of Glacier Park. (9)

Description. - "A small to medium-sized Mouse with small eyes; low ears, just reaching above fur; short tail; pelage rather long and usually characterized by a broad, reddish dorsal band; habitat cool forests and brush areas. Upperparts - winter: dorsal band from crown to base of tail bright chestnut, sprinkled with black; sides buffy ochraceous; feet clear gray; tail bicolor, brownish above, black-tipped, grayish buff below. Underparts - pale buff. Summer pelage slightly darker. Immature pelage with less bright tones and more subdued coloring." (2)

Measurements. - "Total length, 5.6 inches; tail vertebrae, 1.5 inches; hind foot, .72 inch." (2)

Evotomys gapperi galei (Merriam) --- COLORADO RED-BACKED MOUSE.

Type locality. - "Ward, Boulder County, Colorado. Altitude 9,600 ft." (37)

Distribution. - "Boreal zone of mountains of Colorado and northward along eastern ranges of Rocky Mountains to northern Montana." (2)

Description. - "Lighter in color than E. g. gapperi above and with slightly longer tail. Upperparts (winter) reddish chestnut, clearly differentiated from buffy gray sides; feet and

underparts whitish to yellowish gray." (2)

Measurements. - "Total length, 5.8 inches; tail vertebrae, 1.8 inches; hind foot, .72 inch." (2)

Genus Microtus

Subgenus Microtus

Pennsylvanicus Group

Microtus pennsylvanicus modestus (Baird) --- SAWATCH MEADOW MOUSE.

Type locality. - "Cochetopa ("Sawatch") Pass, Saguach County, Colorado." (37)

Distribution. - "Rocky Mountains and western plains from New Mexico to British Columbia and from the Black Hills of South Dakota to central Idaho and beyond with slight variation to the plains of the Columbia, mainly in the Transition zone." (7)

Warren (52) reports the presence of this species in Colorado, Wyoming, South Dakota, North Dakota, Montana, Idaho, Washington, and Utah.

Description. - "Summer pelage: Upperparts dull ochraceous, darkened with black-tipped hair; belly washed with soiled whitish, smoky gray or pale cinnamon; feet plumbeous; tail indistinctly bicolor, blackish above, dull grayish below. Winter pelage: Much darkened above by long black hairs, especially early in the season, later becoming paler than

in summer as the under fur grows longer; belly heavily washed with creamy white; feet paler; tail more sharply bicolor." (7)

Measurements. - "Total length, 7 inches; tail vertebrae, 1.8 inches; hind foot, .82 inch." (2)

Microtus pennsylvanicus wahema (Bailey) --- BADLAND MEADOW MOUSE: BEAN MOUSE.

Type locality. - "Glendive, Dawson,County, Montana." (2)

Distribution. - "Occupy the Badlands section of the Missouri River Valley and range westward over southwestern North Dakota and eastern Montana." (4)

Description. - "A pale form of pennsylvanicus, slightly smaller and very much paler and grayer than the eastern meadow mouse, which it represents in the arid Badlands region. Upperparts buffy gray; sides clear gray, underparts and feet and lower surface of tail pale gray or buffy white." (4)

Measurements. - "Total length 178; tail vertebrae, 43; hind foot, 20." (4)

Microtus drummondi (Audubon and Bachman) --- DRUMMOND MEADOW MOUSE.

Type locality. --"'Valleys of the Rocky Mountains'; probably in the vicinity of Jasper House, Alberta, Canada." (7)

Distribution. - "From Hudson Bay to the west slope of the Rocky Mountains and Alaska, and from the northern edge of the United States north to Fort Anderson, N.W.T., in Canadian and Hudsonian zones." (7)

In Glacier Park they are found in open country around St. Mary Lake, along Swiftcurrent Creek, between Sherburne and McDermott Lakes, at Summit, and on Big Prairie in the North Fork of the Flathead Valley. (9)

Description. - "Upperparts (summer) yellowish bister sprinkled with dark brown or black-tipped hairs; more yellowish on sides of nose and in front of ears; feet silvery gray; tail bicolor, blackish and whitish; underparts white, sometimes washed with buffy. Winter pelage paler, yellower on ears and nose." (2)

Measurements. - "Total length, 5.9 inches; tail vertebrae, 1.6 inches; hind foot, .72 inch." (2)

Montanus Group

Microtus nanus nanus (Merriam)--- DWARF VOLE OR MEADOW MOUSE.

Type locality. - "Pahsimeroi Mountains, Custer County, Idaho. Altitude 9,250 feet." (37)

Distribution. - "Rocky Mountains and outlying ranges from central Idaho southward to central Nevada and southern

Colorado, in Canadian Zone." (2)

Warren (52) states that this species has been reported from Idaho, Utah, Wyoming, Montana (but does not state region), and Colorado.

Description.- "Size small; tail short; ears short and rounded; color dark grayish; skull slender." (2)

"Upperparts (summer) everywhere mixed gray, sepia, and blackish; feet grayish; tail bicolor, dusky gray and whitish; underparts whitish." (2)

Measurements:- "Total length, 6 inches; tail vertebrae, 1.6 inches; hind foot, .72 inch." (2)

Microtus nanus canenscens (Bailey) --- GRAY VOLE or GRAY MEADOW MOUSE.

Type locality. - Not listed.

Distribution. - "Northern Washington and southern British Columbia, east of the Cascades. Apparently confined to the Transition Zone." (2)

Bailey (7) also reports having examined specimens at West Arm of Flathead Lake and Hot Springs Creek (a branch of the Little Bitterroot).

Description. - "Upperparts (summer) mixed pale buffy and black producing general dark gray tone; sides lighter than back; feet dark gray; tail bicolor, blackish and grayish;

underparts white." (2)

Measurements. - "Total length, 6 inches; tail vertebrae, 1.7 inches; hind foot, .72 inch." (2)

Longicaudus Group

Microtus mordax mordax (Merriam) - CANTANKEROUS VOLE; CANTANKEROUS or ROCKY MOUNTAIN MEADOW MOUSE.

Type locality. - "Sawtooth (or Altures) Lake, east base of Sawtooth Mountains, Blaine County, Idaho. Altitude 7,200 feet." (37)

Distribution. - "Rocky Mountains and outlying ranges from latitude 60 degrees to northern New Mexico . . ." (7)

Bailey (9) states that this species is the most abundant and widely scattered Meadow Mouse of Glacier Park. It is found from the lowest levels of the Park to timberline.

Warren (52) states that it has been reported from Alaska, British Columbia, Alberta, Northwest Territory, Idaho, Montana, Wyoming, Washington, Oregon, California, Nevada, Colorado and New Mexico.

Description. - "Upperparts (summer) grayish bister; sides grayer; nose dusky; feet dark gray; tail faintly bicolor, dusky and soiled whitish; underparts whitish. Winter pelage lighter colored, more contrast between dorsal region and sides; underparts whiter; tail sharply bicolor; feet whitish." (2)

Measurements. - "Total length, 7.4 inches; tail vertebrae, 2.8 inches; hind foot, .88 inch." (2)

Subgenus Aulacomys

Microtus richardsoni macropus (Merriam) --- BIG-FOOTED MEADOW MOUSE.

Type locality. - "Pahsimerai Mountains, Custer County, Idaho. Altitude 9,700 feet." (37)

Distribution. - "Boreal zone of the Rocky Mountains from the Wasatch north to Canada, of the Wind River Mountains of Wyoming, the Blue Mountains of Oregon, and most of the intermediate ranges." (7)

Bailey (9) also found them common along streams in the meadows and wet places thruout the Canadian and Hudsonian areas of Glacier Park.

Description. - "Upperparts (summer) dark sepia mixed with black; sides paler; feet dark gray; tail bicolor, sooty and whitish; underparts washed with silvery white. Winter pelage grayer above, with less black; more white below." (2)

Measurements. - "Total length, 8.8 inches; tail vertebrae, 2.8 inches; hind foot, 1.12 inches." (2)

Subgenus Pedomys

Microtus haydeni (Baird) --- HAYDEN MEADOW MOUSE: WESTERN UPLAND MOUSE.

Type locality. - "Fort Peirre, Stanley County, South Dakota." (37)

Distribution. - "Plains region of western South Dakota, Nebraska, and Kansas, eastern Colorada and Wyoming, and southern Montana, in Transition Zone." (2)

Description. - "Upperparts (summer) light gray, grizzled whitish and blackish; feet dusky gray; tail bicolor; dusky and whitish; underparts silvery white to soiled whitish or light buff." (2)

Measurements. - "Total length, 7.2 inches; tail vertebrae, 1.9 inches; hind foot, .88 inch." (2)

Genus Lagurus

Subgenus Lemmuscus

Lagurus pallidus (Merriam) --- PALLID MEADOW MOUSE.

Type locality. - "Fort Buford, Williams County, North Dakota." (37)

Distribution. - "Transition prairies of western North Dakota, Montana, and as far north as Calgary, Alberta," (2)

Description. - " . . . the palest Meadow Mouse found in America. Upperparts pale buffy gray, tinged with buff on ears and nose; feet pale gray; tail dusky above, whitish below; underparts white to soiled whitish." (2)

Measurements. - "Total length, 4.8 inches; tail vertebrae, .8 inch; hind foot, .74 inch." (2)

Genus Ondatra (-Fiber of various authors)

Ondatra zibethica osocyoosensis (Lord) --- ROCKY MOUNTAIN MUSKRAT.

Type locality. - "Lake Osoyoos, British Columbia, Canada." (37)

Distribution. - "Puget Sound region and Rocky Mountains, from southern British Columbia, Washington, Idaho, and western Montana, south in the mountains to northern New Mexico." (25)

Description. - "Fresh pelage: Upperparts varying from uniform glossy mummy brown to black; sides russet; underparts usually heavily coated with cinnamon and dark russet or brown hairs; throat and ventral region lighter; hips black. Worn pelage: Upperparts dull sooty brown, sides and underparts paler, usually with a few rusty overlying hairs. Young: Seal brown, paler beneath." (25)

Measurements. - "Total length, 23.6 inches; tail vertebrae, about 10 inches; hind foot, 3.3 inches." (2)

Ondatra zibethica cinnamonina (Hollister) --- GREAT PLAINS MUSKRAT.

Type locality. - "Wakeeney, Trego Co., Kansas." (37)

Distribution. - "Great central plains region of western United States and Canada; from Manitoba south to northern Texas; east to central Iowa and west to the Rocky Mountains." (25)

Description. - Smaller in size than the osoyoosensis, paler in color. Underparts cinnamon brown. (2)

Measurements. "Total length, 20 inches; tail vertebrae, 9.3 inches; hind foot, 2.9 inches." (2)

Family Muridae

"Form typically rat or mouse-like; molar teeth three on each side, crown pattern tuberculate (in species introduced into North America), tubercles arranged in three longitudinal rows." (2)

Subfamily Murinae

Genus Mus.

Mus musculus musculus (Linnaeus) --- HOUSE MOUSE

Type locality. - "Upsala, Sweden. Introduced and widely established in North America." (37)

Distribution. - In any settled community everywhere in the United States and Canada.

Description. "A small mouse with a long tail, sparsely haired; pelage dull in color, no great contrast between upper and lower parts. Sexes colored alike; no very

noticeable seasonal variation; Upperparts mixed yellowish brown and black; feet brownish; tail above, dusky, below slightly lighter; underparts ashy gray." (2)

A variation of the above coloration came to my attention in October 1933. Two high school girls brought me a mouse which they had found in a trap that morning. It was evidently an albino type because the eyes were pink and the tail was of a pinkish hue. The upperparts were of a fawn or buff color and the underparts were lighter. The feet were pinkish.

Measurements. - "Total length, 6-6.5 inches; tail vertebrae 3.0 - 3.5 inches; hind foot, .70 to .75 inch." (2)

Genus Rattus

Subgenus Rattus

Rattus norvegicus --- NORWAY RAT.

Type locality. - "Norway. Introduced and widely established in North America." (37)

Distribution. - In almost every locality settled by mankind.

Description. - "A good-sized rat, with large, nearly naked ears; long, semi-naked tail, with rather conspicuous annulations; pelage somewhat coarse; brown or grayish above, gray below. Color: sexes colored alike, no noticeable seasonable

variation. Upperparts: Grayish or brownish, with mixture of more or less black; feet grayish or whitish; tail not distinctly bicolor, dusky above, somewhat lighter below. Underparts: Grayish to soiled whitish; transition in color from sides to underparts gradual. Immature pelage duller and grayer than adult." (2)

Measurements. - "Total length, 15-16 inches; tail vertebrae, 7 - 8 inches; hind foot, 1.6 - 1.7 inches." (2)

Family Zapodidae

"Form mouse -like; hind legs and tail greatly elongated; internal cheek-pouches present; upper incisors narrow; grooved in front; crown surface of molars with complex, folded pattern; terrestrial in habit; gait saltatorial (when alarmed); soles of feet naked." (2)

Subfamily Zapodinae

Genus Zapus

Zapus princeps princeps (Allen) --- ROCKY MOUNTAIN JUMPING MOUSE.

Type locality. - "Florida, La Plata County, Colorado." (37)

Distribution. - "Rocky Mountain region from northern New Mexico northward to Henry House, Alberta." (44)

Bailey (9) found them in the open meadows and grassy

spots of Glacier National Park.

Description. - ". . .Upperparts yellowish brown, lightly sprinkled with blackish; dorsal band mixed pale yellowish brown, and black; a clear yellowish brown lateral line separating white of underparts and darker color of sides; tail indistinctly bicolor, paler brown above, grayish white below; ears edged with yellowish white; underparts white, sometimes strongly tinged with ochraceous. Fall pelage blacker along back and more yellow on sides." (2)

Measurements. - "Total length, 9.8 inches; tail vertebrae, 5.9 inches; hind foot, 1.3. inches." (2)

Zapus hudsonius campestris (Preble) --- PRAIRIE JUMPING MOUSE.

Type locality. - "Bear Lodge Mountains, Crook County, Wyoming." (37)

Distribution. - "Great Plains from Manitoba southward to Nebraska and westward to Colorado and Wyoming." (44)

Warren (52) reports this species as being found in Manitoba, North Dakota, South Dakota, Montana, Wyoming, Nebraska, Colorado, and Missouri.

Description. - "Upperparts bright ochraceous buff, sprinkled with black; dorsal area well developed; tail above, dark grayish, below, yellowish white. Dorsal band and ears much darker in fall than in summer." (2)

Measurements. - "Total length, 8.9 inches; tail vertebrae, 5.4 inches; hind foot, 1.2 inches." (2)

Family Erethizontidae

"Large, robust rodents having quills or spines in their pelage, the spines loosely attached to the skin; toes four in front, five behind, all with strong, curved claws; ears short; tibia and fibula distinct; mammae four; molar crown pattern complex." (2)

Genus Erethizon

Erethizon epixanthum epixanthum (Brandt) --- YELLOW-HAIRED PORCUPINE.

Type locality. - "California." (37)

Distribution. - "Utah and Colorado northward through forested country to Alaska; known as far east as North Dakota; south in the Cascade mountains into California, and down the Sierra Nevadas to about Mt. Whitney." (2)

Description. - "A large, clumsy rodent with long sharp spines in its pelage. Head proportionally small; muzzle blunt; lips hairy; body thick and heavy; limbs rather short; four claws on fore feet, five on hind feet; tail short, thick, muscular; pelage composed of fairly long soft, woolly hair which is mixed much longer, hard, glistening hairs and long

spines; spines stiff, sharp and barbed, and occurring all over upperparts from crown of head and sides to end of tail; underparts spineless; gait plantigrade. Color. - Everywhere slaty black, or brownish black to black, liberally sprinkled on upperparts and sides with long hairs tipped with greenish yellow; spines yellowish white tipped with black; spines most conspicuous on rump and tail, more or less concealed elsewhere; incisors orange-red." (2)

Measurements: - "Total length, 32 inches; tail vertebrae, 6.5 inches; hind foot, 4.2 inches." (2)

Erethizon epixanthum bruneri (Swenk) --- NEBRASKA YELLOW-HAIRED PORCUPINE.

Type locality. - "Three miles east of Mitchell, Scottsbluff County, Nebraska." (37)

Distribution. - "Forested areas of Nebraska; limits of range unknown, but recorded from Wyoming, Montana, and Kansas." (2)

Description.- "'Similar to E. epixanthum epixanthum Brandt of California, but slightly larger, with the hind feet comparatively shorter, the general coloration paler and duller, the undersides of the tail largely or wholly brownish yellow. ...'" (2)

Measurements. - "Total length, 34 inches; tail vertebrae, 8 inches; hind foot, 4 inches." (2)

CHECK LIST OF THE RODENTS OF THE SHIELDS RIVER VALLEY.

Marmota flaviventris nosophora (Howell) --- GOLDEN MANTIED MARMOT.

Found thruout the valley. Personally observed at the following places. Along Brackett Creek, Cottonwood Creek, Horse Creek, Rock Creek and Shields River.

Citellus richardsonii (Sabine) --- RICHARDSON GROUND SQUIRREL.

Found thruout the valley. Personally observed during the summer months in all localities. Specimens were taken and examined for parasites from Chadbourne, Montana to the upper reaches of Flathead Creek.

Eutamias amoenus luteiventris (Allen) --- BUFF-BELLIED CHIPMUNK.

Found thruout the valley. Personally observed all along Brackett Creek, Rock Creek, Looking Glass Creek, Horse Creek, Cottonwood Creek. Specimens were taken and examined from localities along Shields River.

Sciurus hudsonicus ventorum (Allen) --- WIND RIVER MOUNTAINS RED SQUIRREL.

Personally observed in Rock Creek canyon, along lower Rock Creek, along the upper reaches of Cottonwood and Duck Creeks, and along Shields River. At no time were they numerous.

Glaucomys sabrinus bangsi (Rhodes) --- Bangs FLYING SQUIRREL.

Reported as having been seen (but not personally observed) in the cottonwood groves found on the banks of Shields River and Rock Creek.

Thomomys talpoides bullatus (Bailey) --- SAGEBRUSH POCKET GOPHER.

Personally observed on Cottonwood bench, and in the foothills of the Crazy Mountains between Duck Creek and Rock Creek.

Castor canadensis missouriensis (Bailey) --- MISSOURI RIVER BEAVER.

Personally observed along Brackett Creek, along Shields River, and in Hammond Creek.

Peromyscus maniculatus artemisiae (Rhodes) --- SAGEBRUSH WHITE-FOOTED MOUSE.

Specimens collected from the areas near Looking Glass

Creek, from the grain fields along Rock and Cottonwood Creeks, and in the dwellings in Clyde Park.

Neotoma cinerea cinerea (Ord) --- GRAY BUSHY-TAILED WOOD RAT.

Specimens collected from barns along Cottonwood Creek, Rock Creek, and Looking Glass Creek.

Microtus pennsylvanicus modestus (Baird) --- SAWATCH MEADOW MOUSE.

Specimens collected from hayfields along Shields River, Cottonwood Bench, and along Rock Creek.

Ondatra zibethica osozoosensis (Lord) --- ROCKY MOUNTAIN MUSKRAT.

Personally observed along Shields River.

Mus musculus musculus (Linnaeus) --- HOUSE MOUSE.

Specimens collected from all localities. Many students in the Clyde Park High School brought me from one to five specimens for my examination.

Zapus princeps princeps (Allen) --- ROCKY MOUNTAIN JUMPING MOUSE.

Personally observed in the vicinity of Brackett Creek,

Shields River, and Rock Creek.

Erethizon epixanthum epixanthum (Brandt) --- YELLOW-HAIRED PORCUPINE.

Personally observed along Shields River, Brackett Creek, Looking Glass Creek, Cottonwood Creek, and Rock Creek.

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